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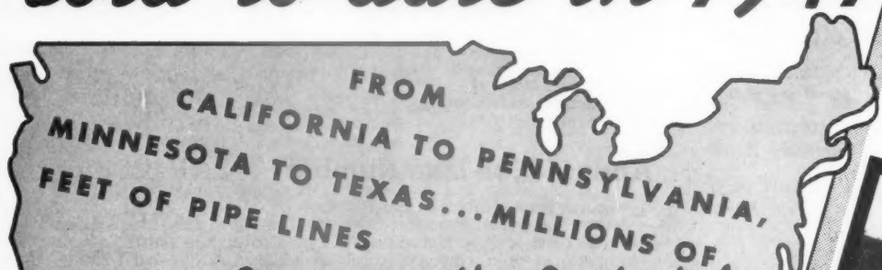
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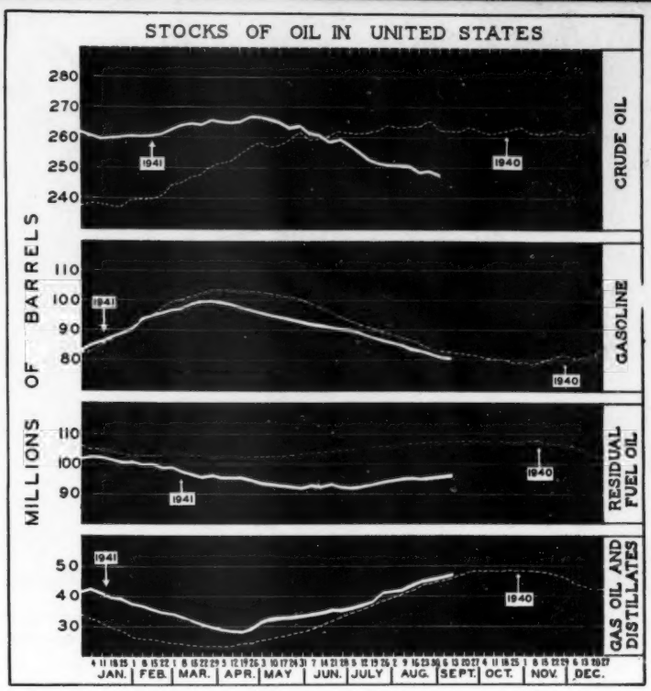
PERMANENT PIPE PROTECTION

Trends

Supply and Demand For Domestic Crude 4,000,000 Bbl. Daily



DOMESTIC crude-oil production last week, for the first time in the history of the petroleum industry, averaged more than 4 million barrels daily. With crude-oil stocks decreasing steadily since March and inventories of most refinery products lower than they were a year ago, many large and small operators are finding it necessary to expand both crude-oil production and refinery operations and the recent peaks in output are the result. Current reports on crude-oil inventories show the increases in production are necessary. For the 4 weeks ending September 6, national crude-oil stocks decreased 2,417,000 bbl. or 86,000 bbl. daily. Crude output for the same period, according to weekly estimates, averaged 3,927,460 bbl. daily. Adding the withdrawals from inventories to this production points to an indicated demand for crude oil through the month of 4,014,065 bbl. daily, which was approximately the average output of domestic fields last week.

CRUDE PRODUCTION *4,027,650 bbl. daily average—up 232,745 bbl. One year ago 3,650,540 bbl.*

CRUDE STOCKS *247,528,000 bbl. as of September 6—down 1,885,000 bbl. One year ago 262,716,000 bbl.*

GASOLINE STOCKS **80,555,000 bbl. as of September 13—down 1,016,000 bbl. One year ago 82,983,000 bbl.*

RESIDUAL FUEL-OIL STOCKS *95,753,000 bbl. as of September 13—up 628,000 bbl. One year ago 107,335,000 bbl.*

GAS OIL AND DISTILLATES *47,271,000 bbl. as of September 13—up 1,144,000 bbl. One year ago 46,556,000 bbl.*

REFINERY RUNS *4,010,000 bbl. daily week ended September 13 — up 15,000 bbl. One year ago 3,580,000 bbl.*

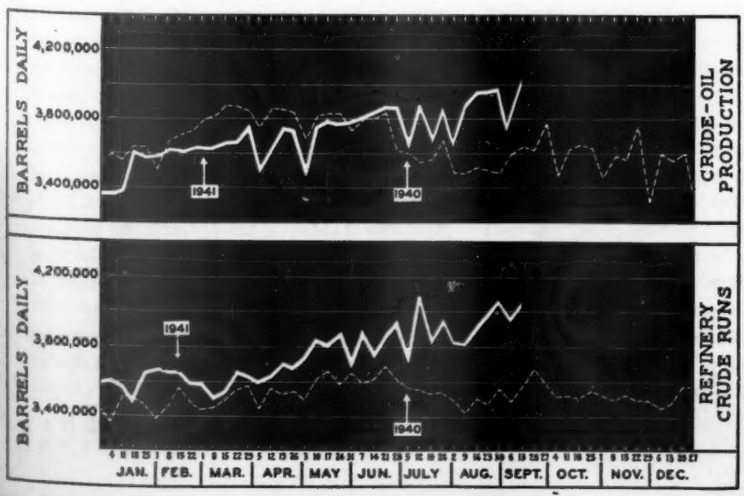
*Includes 7,452,000 bbl. aviation motor fuel, up 268,000 bbl. One year ago 5,875,000 bbl.

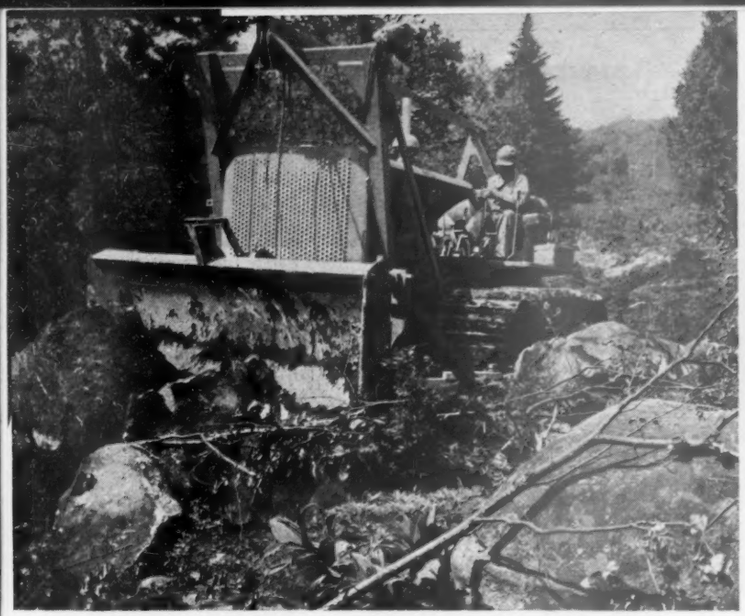
Changes in crude-oil stocks for the month are also of interest because they reflect operating conditions in the several areas which will increase in importance this fall and winter. For the 4-week period, crude-oil stocks decreased approximately 60,000 bbl. daily in Oklahoma, while stocks in Kansas increased 15,000 bbl. daily. Stocks of crude increased in the Texas Gulf but for the state as a whole, inventories were reduced at an average rate of 60,000 bbl. daily. The current situation in Oklahoma and Kansas is of particular interest and representative of conditions which prevail in several other areas. There is a heavy demand for crude in the two states, the requirements exceeding the available supply in Oklahoma and with Kansas in a position to produce more crude if it had the pipe-line outlets. Normally this year there would have been a large expansion in new pipe-line outlets in Kansas due to the greater demands from local and out-of-the-state refineries. This has not been possible because sufficient pipe has not been available for the construction of large or small lines. Those in touch with conditions insist that this situation, which will also be found in other sections, will become serious for many operators unless deliveries on pipe-line purchases are speeded up. It is claimed that too much attention has been paid to new lines which have been justified on the grounds of national defense to the detriment of the older areas which furnish most of the country's crude supplies. This is one of several operating situations in which a lack of supplies is crippling operations and forcing makeshifts which are detrimental to the best interests of the petroleum industry.

DAILY AVERAGE PRODUCTION FOR WEEK

	Sept. 13, 1941	Bur. Mines Sept. est. of demand	Sept. state allowables	Sept. 6, 1941
Arkansas	75,595	79,000	76,000	75,120
California	653,150	634,700	610,000	634,725
Eastern fields	111,500	121,200	.....	111,400
Illinois	391,910	392,500	.....	401,450
Kansas	244,050	239,800	248,800	229,400
Louisiana	335,745	324,000	328,650	333,870
North Louisiana	*80,445*	.....	.....	*78,450*
Louisiana Gulf Coast	*255,300*	.....	.....	*255,400*
Michigan	51,860	39,500	.....	49,860
Mississippi	53,630	33,000	.....	53,445
Nebraska	7,000	5,000	.....	6,950
New Mexico	114,110	113,200	113,200	113,840
Oklahoma	417,300	489,800	428,000	427,975
Rocky Mountain states	105,200	109,700	.....	103,940
Texas	1,466,600	1,378,600	.....	1,252,950
East Texas	*369,750*	.....	.....	*298,550*
West Texas	*280,650*	.....	.....	*226,250*
North Central Texas	*132,200*	.....	.....	*131,600*
East Central Texas	*85,250*	.....	.....	*80,650*
Texas Panhandle	*85,300*	.....	.....	*85,300*
Texas Gulf Coast	*416,250*	.....	.....	*348,800*
Southwest Texas	*97,200*	.....	.....	*81,800*
Total United States	4,027,650	3,960,000	.....	3,794,905

Total production, Jan. 1-Sept. 13 ..... 951,020,995 bbl.
Same period last year ..... 952,075,347 bbl.





Left: Clearing glacial boulders from right-of-way near Mt. Adams, in the White Mountains of New Hampshire, at the beginning of construction of the crude-oil line from Portland, Me., to Montreal, Que. Right: Pipe gang laying 6-in. pipe for the gasoline pipe line built this summer between Topeka, Kans., and Sioux Falls, S. D.

Nation Depends Provide Defense

. . . Crude oil, gasoline and natural-

By HARRY D. HANCOCK

HARRY D. HANCOCK
Chairman, Natural Gas Section, A.G.A., and president, Gas Advisers, Inc.

THE scope of the problems confronting the natural-gas industry in general, and the pipe-line branch of the industry in particular, has not materially altered during the past year but the importance of and emphasis on many features have undergone marked changes. Such changes have been principally the product of the expanding requirements for industrial gas by plants engaged directly or indirectly in the production of materials required in the national-defense program, for all classes of service to military and naval establishments, and for domestic and commercial gas by large sections of population shifting to new or expanding industrial areas.

In proceeding with the addition of facilities with which to supply the increasing fuel requirements, members of the industry are confronted with the difficulties and delays, presently common to industries which are large users of steel products, in obtaining deliveries of required materials for construction, maintenance, and utilization purposes. These problems are being approached by the industry with recognition of the many factors involved in effecting the wisest utilization of our national resources during the period of the present readjustment of industrial activities. As one of its contributions toward the best solution of these problems, the industry is continuing its efforts to be economical in the use of steel and other essential materials through the continued application of the results of technological advancement, and the seeking through research of further improvement, in the production and utilization of these materials. Since steel pipe is the major item of material required by the industry, it is important that its members are enabled in the present emergency to reduce their pipe-tonnage requirements as the result of continued improvement in the quality of pipe material and its fabrication into finished pipe, as well as advancements in methods of protecting pipe from corrosion and in selecting the most economical combinations of size, wall thickness, and pressure which will adequately and safely serve the purposes. The industry is also minimizing its requirements of new steel materials for construction and maintenance purposes through the placing of increased emphasis on the procedure of reclaiming casing, pipe, compressors, and other material and equipment from locations where their further use is not justified and, after reconditioning where necessary, reinstalling elsewhere to assist in meeting the requirements of present and anticipated market conditions.

In addition to the extraordinary problems of construction and maintenance, the industry is devoting itself, in cooperation with various governmental agencies, to numerous other activities presently required. These include the development of precautions against sabotage and measures to be followed in the event of emergencies and public-health work by home-service departments involving correct food preparation, the use of local surplus foods and assistance in all projects to improve community health and physical resistance, especially during the present period of stress.

Although the principal present use of natural gas is as a fuel and source of

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Left: Laying pipe in muddy ground during the winter for Pan American Pipe Line Co.'s crude-oil line from East Texas to the Gulf Coast. Right: Four tractors lowering 26-in. pipe in the ditch for Natural Gas Pipeline Co. of America's 2-year program which calls for the construction of a new line from the Texas Panhandle to Chicago

On Pipe Lines to With Life Blood

gas lines contribute to program

By W. R. FINNEY

W. R. FINNEY
In charge of pipe-line operations for Standard Oil Co. (New Jersey)

OF vital concern to the entire nation is the progress made by the various transportation agencies in preventing a shortage of petroleum products along the eastern seaboard. This vast area tributary to Philadelphia, New York, and Boston has been almost entirely dependent upon tanker deliveries from the Gulf Coast. Unless the loss of receipts caused by the transfer of tankers is made up in other ways, this highly developed industrial area faces a curtailment in gasoline and heating-oil supplies. The threatened shortage, therefore, actually will reflect a lack of distribution facilities rather than of supply, since the great oil-producing states can furnish enough crude and the existing refineries can produce all of the gasoline and refined oils required.

One of the first corrective steps was the fuller utilization of the remaining tankers through changed routing, lower tie-up time effected by faster loading and discharge rates, longer periods between drydocking, and a higher loading line on the vessel. The resulting gain was appreciable and was brought about through cooperative effort by the tanker owners and operators. This increase in the hauling rates of existing tankers will soon be augmented by the completion of new vessels which will be larger, faster, and more economical for all types of service.

The second and no less effective step was the prompt decision of several shippers to use railroad tank cars. This met with full cooperation from the railroad companies in scheduling trainload lots which move through from origin to destination at faster than ordinary schedules. The railroad companies also established lower tariffs, with other reductions to come when volumes justify such action. This type of transportation relief is gaining momentum and, while it possesses certain physical limitations and results in higher delivered cost, it will do a great deal to prevent a shortage from developing.

The third and most comprehensive effort to effect full delivery of all needed crude and refined products is that of the pipeline companies, both in improving the existing systems and laying new lines. The existing pipe lines connecting the producing states of Texas, Louisiana, Oklahoma, Kansas, and Illinois with the large consuming centers tributary to Chicago and the East constitute an important unit of transportation, even when there is no emergency. These pipe lines, individually and in groups, have been working constantly to enlarge, improve, and extend their systems for well over a year. The companies have spent large sums of money for more pipe and bigger stations although in some cases they realize that the useful life of such improvements may be far too short to pay out the investment. This they have done, in the face of rising labor and equipment cost, without any increase in pipeline tariffs, merely hoping that after they have served through this trying period, they will be left with their usual business when the emergency is over.

This suggests a simple plea for the pipeline fraternity, one which might apply to other forms of transportation as well. Let each proposal to relieve the transportation shortage stand on its own feet. Let each

(Continued on Page 73

Economics of Transportation by Pipe Line Constantly Changing

By WALTER M. W. SPLAWN
Commissioner, Interstate Commerce Commission

WALTER M. W. SPLAWN

The author of this article, which was specially prepared for this issue, has been a member of the Interstate Commerce Commission since 1934 and served as its chairman starting in 1938. Previously he was a member of the Texas Railroad Commission. In 1932 he served as special counsel for the congressional committee on interstate and foreign commerce when it conducted an investigation of pipe lines. He has written extensively on pipe lines and other transportation subjects in recent years.

THE pipe line as an important method of transporting petroleum and its products is a comparatively recent development. Not so long ago water was conveyed by a trough from the nearby spring to a residence farther down the hillside. When the trough was covered, the result was a crude water pipe. Distribution of water, and later of gas, furnished a large and growing demand for pipe. This pipe was found as convenient for casing in oil wells and for directing the flow of the oil from the well to a storage tank as it had been in obtaining a supply of water. Engineers associated with the oil companies designed pipe lines from wells to storage tanks, from storage tanks to refineries, from refineries to loading racks or shipside. The discovery and rapid development of oil deposits, the many, the varied, and the extensive uses of petroleum products led to a very rapid growth of the present pipeline networks.

Discovery of a wildcat well, followed by intensive drilling and the sudden flush production of a new oil field temporarily overtaxing existing railroad facilities; improvised storage and the laying of a pipe line by an integrated company to bring crude oil from the field to its refineries or to a port where it would be loaded into tank steamers and transported by water to refineries on the Atlantic seaboard or in foreign countries, has been the usual procedure for the building of pipe lines. There have been few variations from this pattern. There are now 54,500 miles of gathering lines and 62,400 miles of trunk lines for the transportation of crude oil. The gathering lines range from 2 to 12 in. in diameter, according to the flow of the wells. The average is about 5 in. The crude-oil trunk lines commonly are 8 to 12 in. in diameter. In striking contrast is the proposed crude-oil line from the Southwest to the Atlantic Coast, which would be 24 in. in its major segment. Although there are some natural-gas pipe lines of approximately this size, the aforementioned line would be larger than any now in use for the transportation of petroleum. The effect of size on costs of operation is an interesting aspect of this project.

Natural gas is a byproduct of the petroleum industry. Natural-gas pipe lines of all sizes now total approximately 100,000 miles, exclusive of distribution systems.

Ten-Year Progress

During the past 10 years there has been an extensive and increasing use of pipe lines in the transportation of gasoline and other refined petroleum products. There were approximately 9,500 miles of gasoline pipe lines in 1940, and it appears that between 2,500 and 3,000 additional miles of line will be constructed during 1941. The conveying of gas and gasoline as well as crude oil by pipe line has followed improvements in the quality of the pipe, the use of protective measures in preventing corrosion of the pipe, and the use of welding rather than screwing the pipe couplings. These improvements in the pipe and in laying and joining the pipe have made it possible to convey the liquid or gas under high pressure. The capacity of the pipe to withstand these high pressures has made it feasible to place adequate pumping stations at intervals and to propel the oil or gas through the pipe for any distance it may be necessary to lay it.

The moving of the freight through the pipeline container is a distinctive characteristics of pipe-line transportation. In shipping most commodities, it is necessary to arrange them in convenient packages which are placed on the back of a mule, in a cart, wagon, car, trailer, ship, or an airplane. Trailers and cars may be strung along behind or in front of a motor, but in the case of trailers and trains the packages are loaded into and out of a vehicle which moves with them, just as in the case of a ship or an airplane. Before the trailer can be moved with the packages placed in it, a hard-surfaced road must be provided. Before a train of cars with the packages placed in them can be pulled, a highly specialized roadbed must be constructed. Once the highway is built motor cars may shuttle trailers and tank cars back and forth. After a railroad has been completed, powerful locomotives can pull trains of cars as required. But the pipe line differs from the highway and the railroad in that no vehicles move on it or through it. It is capital in fixed form, more highly specialized in its use than a highway or a railroad. Once the pipe line has been laid and buried, the freight moves inside of it. The motors which propel the fluid are stationary. It is only the freight which moves and it may be taken from the pipe wherever it is convenient to build a storage tank. When the demand for oil is slack, the pumps are stopped, and the freight lies in storage in the pipes. If competitive drilling results in overproduction and a glut of the market, proration regulations hold the oil or gas back in the earth, permitting only such increments to be taken as the market will absorb at prices fixed as fair. Such increments, under proration, are moved through the pipe lines as are required by market conditions. Once a pipe line is laid it has the effect of moving the deposits of oil to the point reached by the pipe line. After a system of waterworks has been installed in a city, any householder has a supply of water so long as there is any in the reservoir. After a pipe line has been laid, the refinery at the destination has crude oil so long as the fields at the origin are not drained, or in the case of gasoline, the dealer at the destination terminal has gasoline in the storage tank so long as the refineries at the origin are not shut down. A factory at the destination of a gas pipe line has a supply of fuel as available and as dependable as if the gas field were in its back yard, and the supply continues until the field is exhausted.

Specialized Nature of Business

The pipe line is the most highly specialized means of transportation. Vehicles adapted to transport any commodity may be moved over the highway or the railroad. Every variety of boat may be launched upon the waterways. A tank truck, a tank car, or even a tank steamer is small enough as a unit to be adapted to carrying almost any liquid in relatively small quantities; but a pipe line in efficient operation requires the continuous flow and consequently movement in great volume. The petroleum industry with an annual production of more than 1,300,000,000 bbl., supplies a commodity in such volume as to make transportation by pipe line most convenient and, under certain conditions, most economical. When construction of a pipe line is considered, whether it be a gathering line or a trunk line, the first question is whether the supply of oil will be sufficient in volume and the flow sustained for a long enough period to amortize the investment at rates which are reasonable.

Many oil fields are remote from centers of population and industry. Pipe lines have been found

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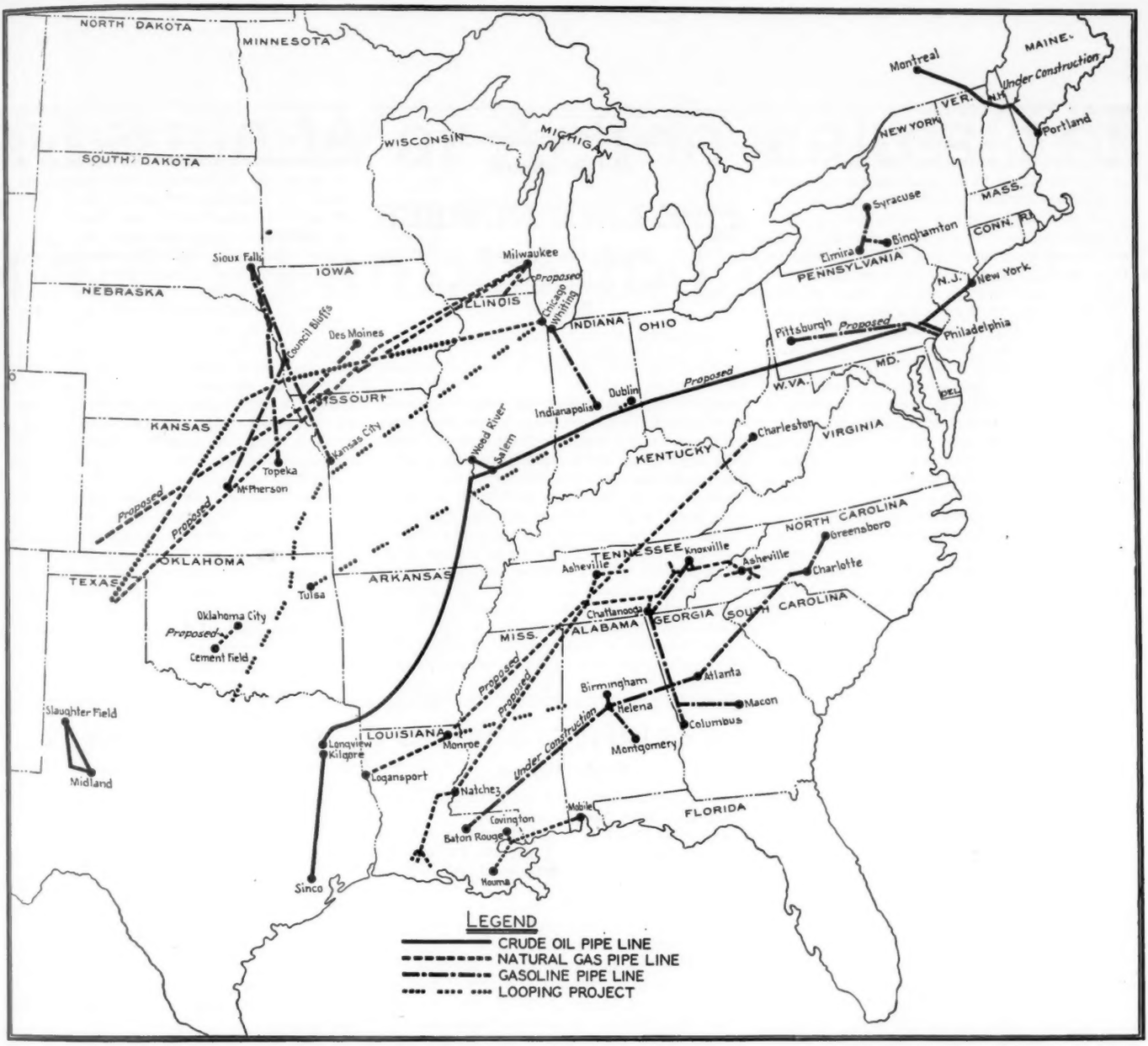

Map showing principal crude-oil, gasoline, and natural-gas lines completed within a year, now under construction, and proposed

Pipe-Line Progress in '41

By PAUL REED

THE vital importance of pipe lines for the national welfare has been emphasized by the developments in 1941, which have directed attention to the advantages of this efficient means of transportation during the current period of emergency. All branches of pipe-line industry have continued to expand in the face of the mounting demands for steel. During the first 9 months of 1941, new pipe-line construction already completed and now in the process of construction represents more than 6,000 miles as compared with 5,000 miles at this time in 1940, and 4,000 miles in 1939. Construction work, instead of being fairly evenly distriouted among the three branches of the industry as it was last year, has been divided so that more than half of it has been concentrated in pipe lines for the transportation of gasoline and other refined products which account for nearly 2,700 miles, while approximately 1,800 miles have been laid for crude-oil lines, and 1,500 miles have been laid for natural-gas lines, for small as well as large projects.

The year so far has been characterized by plans for large and unusual projects, some of which are now being built. During the first half the principal activity was in Kansas, Nebraska, and Iowa where more than 840 miles of gasoline lines were being laid for the projects of three companies and where work started on the 400-mile program for laying 26-in. pipe to enlarge facilities for transmitting natural gas to Chicago and other northern markets. The middle of the year has been dominated by the demands put on the pipeline industry by shortage of transportation for supplying the East Coast due to the withdrawal of tankers for British service. The immediate result of this was the crude-oil pipe line from Portland, Me., to Montreal, Que., started at the end of June and scheduled to be placed in operation soon after November 1. Of greatest concern to the industry this year have been the plans for the 1,586-mile project of National Defense Pipe Lines, Inc., for the transportation of crude from Longview, Tex., and Wood River, Ill., to the Philadelphia-New York area; negotiations for this project have been carried on for several months. As the last quarter of the year is approached, the largest construction job under way is that of laying the 1,261-mile line of Plantation Pipe Line Co. through the southeastern states. At this season the industry has proposals for more than 6,600 miles of new lines. Two-thirds of these are for natural-gas lines. It is unlikely that all of these would be built even under the most favorable circumstances.

This year state and federal governments have taken steps to cooperate with pipe-line expansion because of the recognition that pipe-line transpor-

tation is vital for supplying industrial areas and training centers. In granting priorities for pipe, preference has been shown to pipe-line projects contributing to national efficiency. The Cole right-of-way bill passed by Congress makes it possible to eliminate difficulties in buying right-of-way by giving necessary pipe-line enterprises the power to condemn. The first projects authorized to use the powers granted by this bill are Plantation Pipe Line Co. and Southeastern Pipe Line Co. By using the right to condemn, the latter company will be able to complete the 450-mile gasoline pipe line from Port St. Joe, Fla., to Chattanooga, Tenn., in which there are now more than 30 miles of gaps as the result of obstruction by railroads.

The turn of the year found Pan American Pipe Line Co. approaching completion of the 262-mile crude-oil system connecting East Texas with the company's refinery at Texas City, Tex. The laying of this line was ordered by a decision handed down in a lawsuit brought in New York State. Early this year, Stanolind carried on extensive repairs on lines in Texas and embarked on looping the trunk line extending north to provide for shipping three grades of crude separately to the company's refinery at Whiting, Ind. Outside of these projects just mentioned and the Portland-Montreal line, the principal crude-oil pipe-line construction has been on the Gulf Coast, West Texas, western Kansas, and Illinois. In California, Shell Oil Co., Inc., is laying an 86-mile line.

Venezuelan Crude Movement

Several unusual movements of crude oil have been handled this year. Shipments of Venezuela crude started by Standard of New Jersey interests late last year through a pipe-line hookup between Marcus Hook, Pa., and Sarnia, Ont., were discontinued in the spring when it became evident that the full capacity of the eastern crude lines would be required for moving oil eastward due to the tanker shortage. On July 1, Stanolind Pipe Line Co. began moving 7,000 to 8,000 bbl. per day from fields near Houston, Tex., to Whiting, Ind. Since last fall Gulf Refining Co. has continued to make shipments of Oklahoma crude through a series of pipe lines between Glenn Pool, Oklahoma, and Philadelphia, Pa. (tariff, 57 cents per barrel). In May, Standard of New Jersey interests made arrangements for shipping crude oil from East Texas, Louisiana, and Arkansas through a pipe-line hookup by way of Glenn Pool and Wood River, Ill., to Bayway, N. J. (tariff, 67½ cents). The systems used for movement from East Texas consist mostly of old lines having a large amount of pipe which has been in the ground several decades; these lines follow a circuitous route which is considerably longer than a direct line. While the route planned for the line of National Defense Pipe Lines, Inc., from East Texas to the East Coast deviates somewhat from the most direct route, it is the most direct route ever laid out from southwestern fields to eastern seaboard refineries.

Because of the directness of the route and the estimated savings possible with large-diameter pipe it is estimated that low-operating costs will be possible in the vicinity of 11 and 12 cents per barrel without amortization. With amortization charged in the customary way, operating costs would be about 15 or 16 cents per barrel. According to the plans which have been made, this line would be operated with a program set up for 5 years on a tax-free and nonprofit basis with amortization charged at 20 per cent per year, which indicates a rate close to 30 cents per barrel.

Uncertainty on Defense Line

Because of the stand taken by SPAB in refusing National Defense Pipe Lines, Inc., permission to obtain plate steel for the 22-in. and 24-in. pipe which would comprise most of the proposed line, according to recent plans, there has been uncertainty as to the status of the project and some skepticism as to the prospects for its being built. However, in the face of refusal to grant priorities, negotiations for procuring steel for the line are continuing this week. Whatever the immediate outcome of these negotiations, it is certain that study of plans for the line has had a profound effect not only on the petroleum industry and government officials but also on the public at large. With naval hostilities spreading as they are, the significance of an interior artery becomes more apparent. Such a line of supply cannot be sunk by submarines.

The extension of lines capable of transporting as many as nine different grades of gasoline and other refined products is a logical sequence to the experience of recent years which demonstrates the economy and efficiency of this form of transportation. Gasoline lines in the southeastern states and expansion of crude-oil pipe-line facilities for supplying the eastern states and eastern parts of Canada are freeing tankers for service where they are most needed.

The requirements of defense industries are demanding expansion of natural-gas pipe-line facilities. The attempts of Natural Gas Pipeline Co. of America, Independent Natural Gas Co. (Phillips Petroleum Co.), and Western Natural Gas Co. (El Paso Natural Gas Co.) to get permission to enter Wisconsin have been watched with interest by the industry for over a year. It is expected that a decision will be made this month by a Wisconsin commission that will determine which one of these companies will be authorized to enter this state which is now without any natural-gas lines. Hope Natural Gas Co. and the recently organized Tennessee Gas & Transmission Co., have plans for two large projects in the South and East, which will use gas from Louisiana. Southern Natural Gas Co. and United Gas Pipe Line Co. are expanding extensively in the Gulf Coast states. Panhandle Eastern Pipe Line Co. plans to lay several hundred miles to serve Michigan.

It is evident that all branches of the pipe-line industry are entering an era of expansion which can be restricted only by shortage of materials.

The Principal Section of this annual

PIPE-LINE NUMBER

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LIST OF 1941 LINES COMPLETED OR UNDER CONSTRUCTION . . .

Crude-Oil Lines

Pan American Pipe Line Co., 262 miles, 10 and 12-in., from East Texas to Gulf Coast.

Stanolind Pipe Line Co., 160 miles of 8 to 18-in. loops between North Texas and Chicago; 65 miles of loops from Washington, Kans., to Freeman, Mo.

Pure Transportation Co., 55 miles of 6-in. from Cumberland pool, Oklahoma, to Texas Pipe Line and to Fittstown, Okla.

Magnolia Pipe Line Co., 65 miles of 6 and 8-in. from La Gloria to Corpus Christi, Tex.; 53 miles from Abell pool, Texas.

Gulf Refining Co., 202 miles of 10-in. loops between Glenn Pool, Oklahoma, and Dublin, Ind.; 26 miles of 10-in. in four loops between Midland and Ranger, Tex.

Portland Pipe Line Co. and Montreal Pipe Line Co., Ltd., 236 miles of 12-in. from Portland, Me., to Montreal, Que.

Shell Oil Co., Inc., 86 miles of 10-in. from Ventura to Los Angeles, Calif.

Proposed Crude Lines

National Defense Pipe Lines, Inc., 1,586 miles of 16, 22, and 24-in., Longview, Tex., and Wood River, Ill., to Philadelphia-New York area.

Gasoline Lines

Magnolia Petroleum Co., 62 miles of 6-in. from La Gloria to Corpus Christi, Tex.; 200 miles of 3½-in. from Fort Worth, Tex., to Oklahoma City, Okla.

Plantation Pipe Line Co., 1,261 miles of 4 to 12-in. from Baton Rouge, La., to Greensboro, N. C., and laterals.

Standard Oil Co. (Indiana), 110 miles of 6-in. from Burlington Junction, Mo., to Des Moines, Iowa; 169 miles of 6-in. from Council Bluffs, Iowa, to Sioux Falls, S. D.; 150 miles of 8-in. from Whiting to Indianapolis, Ind.

Socony-Vacuum Oil Co., Inc., 150 miles of 6-in. from Syracuse to Ithaca, Elmira, and Binghampton, N. Y.; 335 miles of 6-in. from Topeka, Kans., to Sioux Falls, S. D.

Globe Oil & Refining Co., 225 miles of 6-in. from McPherson, Kans., to Council Bluffs, Iowa.

Proposed Gasoline Lines

Sinclair Refining Co., 350 miles of 6-in. from Marcus Hook, Pa., to Pennsylvania-Ohio state line.

Natural-Gas Lines

Southern Natural Gas Co., 130 miles of 14-in. from Perryville to Logansport, La., and 134 miles of 10¾ to 22-in. loops in Mississippi, Alabama, and Georgia.

Natural Gas Pipeline Co. of America, 405 miles of 26-in. looping program now under construction west of Mississippi River to Texas Panhandle along route of present 24-in. line to Chicago, Ill.

Magnolia Petroleum Co., 200 miles of 14 and 16-in. from Jackson County, Texas, to Beaumont, Tex.

United Gas Pipe Line Co., 200 miles of 12 to 16-in. from Houma, La., to Mobile, Ala.

Proposed Natural-Gas Lines

Panhandle Eastern Pipe Line Co., 433 miles of 4 to 26-in. for looping eastern section of line and expansion in Michigan and extension in Illinois.

Natural Gas Pipeline Co. of America, 460 miles of 26-in. to complete line from Texas Panhandle to Chicago (total 865 miles).

Hope Natural Gas Co., 826 miles, 20-in. from Monroe, La., to Corwell station, near Charleston, W. Va.

Tennessee Gas & Transmission Co., 1,426 miles of 16-in. from southern Louisiana to Nashville, Lebanon, Chattanooga, and Knoxville, Tenn., and Hendersonville, N. C.

Western Natural Gas (El Paso), 802 miles of 26-in. from Hugoton, Kans., area to Milwaukee, Wis.

Independent Natural Gas Co. (Phillips), 820 miles of 22-in. from Texas Panhandle to Milwaukee, Wis.

Marine War Action Takes Toll Of 103 Tankers to Date

By J. P. O'DONNELL

NEW YORK, Sept. 15. — Even with the vast tanker-building program now under way in United States shipyards, it will be a matter of years before losses resulting from the current war are replaced. The reported loss of tankers (Table 1) for the first 2 years of the war totals 103 vessels with an aggregate deadweight of 1,187,000 tons. Actual losses may be considerably higher than these figures. In addition to the tankers which have been lost there have been many vessels disabled. There are numerous tankers flying flags of belligerent countries which are interned in neutral ports and there are other tankers, including 12 of the largest and fastest afloat, which have been requisitioned by the Navy.

Of the reported tanker losses, 30 per cent are vessels that were built within the last 6 years and were modern. About 40 per cent were built in or prior to 1925 while some were more than 40 years old. Included among them were the Emile Miguet, a French tanker of 21,500 dwt., one of the largest afloat, which was sunk within a month after the war began. Early this year Great Britain lost the Terjeviken of 25,000 dwt. It was completed in 1936. Great Britain, of course, lost the greatest number of tankers, 48, though Norway's smaller fleet was proportionately harder hit with the loss of 25. The majority of the reported losses were the result of submarine attacks which accounted for 65 per cent of the total. Mines accounted for the loss of about 20 per cent, and warship attacks 15 per cent. A few others were scuttled while several were reported sunk by bombing.

The effect of the war on tanker transportation, loss of ships and markets, has been world wide. Every major producing country in the world, with the possible exception of Russia, has been affected.

South American Situation

Just as the lack of tankers has forced a cutback in production, it has also necessitated restrictions on consumption in countries dependent on tanker transportation for oil. A number of South American countries, not self-sufficient, have been hit by inadequate tanker transportation facilities, and a number of them have instituted restrictive measures. Chile, Brazil and Uruguay are among the countries hardest hit. Brazil recently imported some gasoline from Mexico, resuming oil trade with a country with which it was suspended last year.

The condition of the Latin-American countries is similar to that of the eastern United States, normally supplied almost entirely by tanker. Approximately 850,000 tons have been withdrawn from this service, 500,000 tons in the first transfer of 50 tankers to the British shuttle service and 350,000 tons more in a reported second transfer. This is being met in part by the transfer of tankers from the West Coast, four of which were recently assigned to East Coast service.

The only complete solution to the tanker transportation problem is the construction of new vessels though the use of ships now interned will aid considerably. Twenty-six tankers of Axis countries are now interned in Western Hemisphere ports and will be utilized. They include 22 Italian, 2 German and 2 Danish vessels. Nine French tankers which are also interned cannot be used.

United States Program

In an effort to make up for the losses, the United States is engaged in the greatest tanker-building program in history. During 1942 and 1943 tankers will come off the ways in domestic shipyards at the rate of more than one a week. How this program compares with that of recent years is shown in Fig. 1 covering actual construction in the years from 1934 through 1940 and estimates for the following 3 years. Early last month there were 148 tankers either under construction or contracted for in this country. Tables 2 and 3 give the tanker construction by years and companies for the United States.

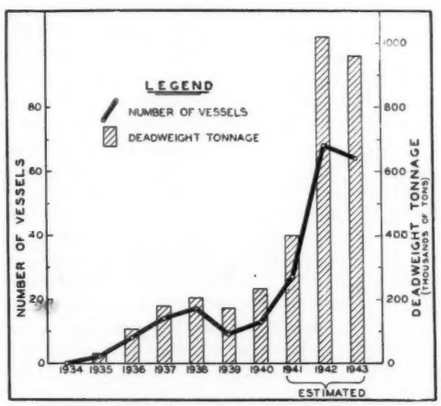

Fig. 1—Chart showing tanker construction since 1934, and estimated construction through 1943. Data courtesy American Bureau of Shipping

Estimates of the expenditure entailed in the tanker construction program run as high as $370,000,000. Even this large sum will be expanded when contracts are let for 16 small tankers by the Maritime Commission. Bids for construction of these tankers which will be used in coastal service were recently opened but were unsatisfactory to the commission. Inclusion of these tankers would increase the total planned or under construction to more than 160.

A number of alternatives to serve during the emergency have been proposed including one which was used successfully in the World War, the utilization of double bottoms and deep tanks in cargo vessels. Admiral Land, chairman of the Maritime Commission, has proposed the use of concrete barges and requests for proposals have been sent to 74 contractors. Each of these barges would be capable of transporting 40,000 to 45,000 bbl. of oil. Veteran tanker operators believe such a barge would reduce the speed of a towing tanker so that the increased capacity would be offset by the loss in speed.

TABLE 1—REPORTED WAR TANKER LOSSES SEPT. 1, 1939-SEPT. 1, 1941

Registry—	No. of vessels	Tonnage (deadweight)
British	48	585,000
Danish	1	16,000
Netherlands	6	58,000
Panamanian	5	56,000
French	4	48,000
Swedish	4	52,000
Norwegian	25	283,000
German	5	54,000
Italian	5	35,000
Total	103	1,187,000

TABLE 2—UNITED STATES TANKERS COMPLETED 1930-1943

(1941-2-3 estimated)

Year—	No.	Year—	No.
1930	10	1938	17
1931	6	1939	11
1932	0	1940	15
1933	0	1941	27
1934	0	1942	68
1935	2	1943	64
1936	8		
1937	14	Total	242

TABLE 3—TANKERS UNDER CONSTRUCTION OR CONTRACT IN UNITED STATES YARDS

(Data as of August 1, 1941)

Owner—	No. of vessels	Gross tonnage
Petroleum Shipping	3	29,400
Sinclair Refining	9	82,900
Socony-Vacuum	7	68,600
Union	5	43,600
Richfield	1	8,000
Panama Transport	2	19,600
Continental	1	8,000
Gulf Oil	4	35,200
Standard (N. J.)	11	118,200
Texas Co.	6	57,600
Atlantic Refining	4	42,550
Keystone Tankship	2	10,000
Sun Oil	2	22,800
Standard (Calif.)	2	22,800
National Bulk Carriers	2	18,900
Maritime Commission	87	875,250
Total	148	1,463,400

Deep Tanks Used

One alternative that is being practiced successfully is the use of deep tanks on cargo vessels on the Pacific Coast. Ships in the South American trade carry edible oils in these tanks while intercoastal vessels use them for transporting lubricating oil from the Atlantic to the Pacific Coast. In the future these cargoes will be discharged at San Pedro, Calif., and the tanks reloaded with fuel oil for delivery to Puget Sound and Columbia River ports. It is estimated that it will be possible to deliver 100,000 bbl. per month by this means.

The tanker situation will also be eased somewhat by the removal of the barrier against foreign-flag tankers which prevented them from supplying United States possessions. Under this rule Puerto Rico will be supplied from Curacao and Aruba instead of the United States Gulf Coast and the Philippines will be supplied by British and Norwegian tankers from the Netherlands East Indies instead of from California.

Watching WASHINGTON

By HENRY D. RALPH

Davies Insists Oil Shortage Exists on Atlantic Seaboard

WASHINGTON, D. C., Sept. 15.—An acute shortage of petroleum supplies still exists on the Atlantic seaboard, despite the findings of the Senate committee which has been investigating the alleged shortage to the effect that there is not now and never was any deficiency, Ralph K. Davies, acting petroleum coordinator, reported late last week.

Mr. Davies issued a statement backing up his contention that an actual shortage, caused by the diversion of American-flag tankers to the British service, does exist, immediately following the submission of a "hurriedly prepared" preliminary report to the Senate by Sen. Francis Maloney of Connecticut, chairman of the committee.

Pointing out that while the original daily shortage on the East Coast, estimated at 353,200 bbl., has been reduced slightly more than half through a fuller utilization of every alternative method of transportation, including tank cars, pipe lines, barges, and motor trucks, and by the adoption of speedier, more efficient transport operating practices, Mr. Davies reiterated his previous appraisal of the present and future stock deficiency in the Atlantic states and urged the necessity for continued public cooperation.

"We still have a deficiency, but none can gainsay that the East Coast is materially better off today than had the situation been allowed to drift; had no effort been made to avert what surely would have been an acute shortage in fuel oils and gasoline," Mr. Davies declared.

Replies Directly to Charge

Replying directly to the charge contained in the committee's report that the shortage "is a shortage of surplus—and not a shortage of products, or a lack of facilities to transport them," the acting coordinator said:

"The problem of whether insufficient surplus comprises a shortage obviously will be determined by how much demand is made upon stocks. When the surplus remains consistently below last year, when demands for petroleum products remain consistently higher than last year, when normal means of transportation to replenish surplus are cut off drastically—then in the opinion of the coordinator, a problem of shortage does exist."

In its report to the Senate, the committee charged that in the handling of the entire petroleum problem, "unnecessary alarm was created," caused by "overenthusiasm" on the part of the coordinator's office.

"Had an adequate analysis been made by those to whom the responsibility of coordination was delegated," the report stated, "the confusion of the past few months might have been avoided."

Upon the basis of testimony by J. J. Pelley, president of the Association of American Railroads, and Ralph Budd, transportation commissioner of the old National Defense Advisory Commission, to the effect that the railroads could meet any deficiency in transportation facilities required to transport a minimum of 200,000 bbl. of petroleum daily to the East Coast refining centers, the committee concluded that "there is no shortage of transportation facilities."

Testimony of Leon Henderson, price administrator and member of the recently created SPAB, C. F. Dowd, chairman of the tank-car subcommittee of the transportation committee for District 1, and evidence submitted by Mr. Davies in 2½ days of questioning, all to the contrary, was dismissed by the committee with the statement that "it should be reported that the acting petroleum coordinator, and at least one or two others who testified, were reluctant to accept the accuracy of the statements of Mr. Budd and Mr. Pelley."

Summarizing its findings, the committee said:

"Our conclusions may best be summed up by stating that there is no shortage of petroleum products—nor a shortage, as of this date, of transportation facilities—but that the whole frightening picture, from the standpoint of the coordinator's office, seems to lie in the fact that the shortage, which has excited the activity of the coordinator, is really a 'shortage' in a large surplus which is desired.

"Paradoxical as it sounds, the shortage, as we see it, is a shortage of surplus—and not a shortage of products, or a lack of facilities to transport them."

Calling for elimination of present restrictions upon the use of gasoline, the committee urged "immediate increase in the use of tank cars, a constant increase in facilities through the continuing construction of tankers, much help through the improved use of pipe lines now in operation and under construction, the more extensive use of highway oil-carrying motor trucks, and the probable construction of barges; and at the same time an increased efficiency in the use of all forms of transportation in this industry."

In his statement, Mr. Davies pointed out that stocks of petroleum and products on the East Coast at the present time are 8,937,000 bbl., or 13 per cent, less than was on hand at this time last year, although demand for the remainder of 1941 is estimated at 10 per cent greater than for the last 4 months of 1940.

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Eastern Oil Men Disregard Senate Body's Conclusions

By J. P. O'DONNELL

NEW YORK, Sept. 16.—Conclusions of the special Senate committee which investigated the East Coast oil-supply situation and its recommendation that "present restrictions should be lifted" are expected to be disregarded by those charged with the duty of maintaining supplies to Atlantic Coast states. This expectation is based on the fact that while current demand is being met there is still ample grounds for concern in the fourth quarter of 1941 and the first quarter of 1942 when total demand will be 20 per cent greater than in the second and third quarters of this year.

A representative of the East Coast marketing committee which recommends the motor-fuel quotas released by the petroleum coordinator's office said that the committee fully expects to continue its operations.

Fears that one-fourth of the 8,000 filling stations in New York City would be out of gasoline by the end of the month because of the rationing now in effect were expressed by Nathan Gelfer, president of the Gasoline Station Council of Metropolitan New York. Mr. Gelfer said a shortage was avoided last month only because dealers were permitted to draw on their September supplies.

"Some dealers will run out of gas, if the rationing isn't lifted, somewhere around September 20, and each day after that it will be more severe," he said.

Another indication that the industry does not believe the potential deficiency of supplies has

been obviated is that plans for construction of the Texas-New York crude line are still being pursued. Construction of the line with seamless pipe is being considered. This alternative is undesirable for the reason that such pipe could be delivered only at the rate of 100 miles per month, which would make it impossible to build the line in less than 15 months.

Socony-Vacuum Head Endorses Stand

John A. Brown, president of Socony-Vacuum Oil Co., Inc., and chairman of District 1, endorsed the stand taken by Deputy Coordinator Davies, who told the Senate investigation committee that "we are far from a condition warranting complacency."

"I endorse the statement . . . that we should continue to curtail gasoline consumption here in order to avoid the possibility of an embarrassing shortage of petroleum products during coming months," Mr. Brown said.

"The question is asked why we should economize in the use of gasoline now when autumn is at hand and the big demand for gasoline is assumed to be passed. It will surprise many people to know that while gasoline sales are heaviest in summer, the total demand for petroleum products as a whole in this area is from 40 to 45 per cent greater in December than it is in July.

"This means that the industry must transport more petroleum into this region between now and the end of the year than would be required in the summer if present stocks here are to be maintained. Usually the industry draws somewhat upon these stocks in the eastern area during the last few months of the year, but with the existing shortage of normal transportation and lack of certainty whether tankers now in use will all remain in this service, the industry should try to keep those stocks just as high as possible.

"To relieve the transportation shortage caused by diverting tankers to the aid of Britain the oil coordinator and the industry have cooperated in various ways . . . and . . . have been able to make up the transportation shortage to a very great degree. Public hardship has been avoided and stocks of petroleum products were only 9,000,000 bbl., or 12 per cent, less at the end of August than on that date last year. Nearly half of this decrease, however, is in industrial fuel oil which is vital to the operation of our factories and the continuance of the defense program. As transportation facilities are interchangeable to a substantial degree lower gasoline needs ought to improve the heavy fuel position. . . . "

East Coast stocks of crude oil, gasoline, heating oil and heavy fuel oil were increased only 214,000 bbl. from August 2 to August 30. This was an average of but 7,650 bbl. per day. However, the A.P.I. fact-finding committee estimated that the winter demand through the last 3 months of 1941 and the first 3 of 1942 will average 292,000 bbl. daily greater than during the past summer. Since many of the suggested remedies were in effect during August, it is obvious that the institution of new remedies and improvement of efficiency of those already adopted is necessary in this and later months.

Two remedies which, it is believed, have been overemphasized are the utilization of tank cars and construction of new tankers. Seven new tankers were completed in August but it is probable that several of these will be used in other than coastwise service. In addition, one of the seven is a national-defense-type vessel and is subject to call by the U. S. Navy, a possibility that is believed to be enhanced by newly extended duties of the Navy.

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Transportation Committee Finds Shortage of Tank Cars

NEW YORK, Sept. 16.—An investigation of the tank-car subcommittee of District 1 transportation committee will prove conclusively that there is only a small fraction of 20,000 tank cars available for transportation of oil to the East Coast.

The investigation, instituted following the implication of J. J. Pelley, president, American Association of Railroads, at last week's Senate hearing on the East Coast oil shortage that there are 20,000 cars available, is now being completed and will be submitted to the Office of Petroleum Coordinator this week. Members of the District 1 transportation committee declined to discuss the results of the investigation but it was learned on reliable authority that it has found there are at best but a few thousand tank cars available instead of 20,000. This number would be totally inadequate to meet the transportation problem which the oil industry faces as a result of the transfer of 800,000 tons of tankers to Great Britain.

Railroad men themselves estimate that it would require 20 days to make a round trip by tank car from East Texas to North Atlantic refineries. On this basis a 10,000-gal. tank car would be able to deliver an average of only 12 bbl. per day to the East Coast.

Even though some companies can obtain crude-oil supplies at much closer points such as Lima, Ohio, from which Standard of New Jersey is shipping crude to Bayway by rail, the proven number of tank cars would be inadequate. It requires 7 days for a round trip between Bayway and Lima so that the average 10,000-gal. tank car in this service delivers but 34 bbl. per day. In addition, crude-oil supplies at such convenient points are definitely limited and many companies will have to obtain their supplies from southwestern sources.

Difficulty Already Encountered

It is known that some companies have already encountered difficulty in trying to obtain cars to meet their requirements. Part of this is credited to the fact that some oil companies have more than are sufficient for their immediate needs. However, the number is reported to be so few that it would afford only insignificant relief when East Coast oil demand reaches peak proportions in midwinter. Part of the shortage of available tank cars is also attributed to the fact that a number have been transferred from the Midwest to the Pacific Coast. Demand for tank cars on the West Coast is said to be high as a result of the transfer of tankers which normally carried products in Pacific coastwise service to the Gulf-North Atlantic run to relieve the similar but more pronounced situation there.

One of the preliminary steps in the investigation by the East Coast tank-car committee was a telegraphic pool of between 190 and 200 tank-car leasing companies, oil companies, railroads and other companies. Together they represented the ownership of more than 147,000 tank cars and replies were received from a group representing 98 per cent of that total. This survey is said to have indicated that instead of 20,000 idle tank cars there is a shortage already and, in addition, that some 4,000 of the 147,000 are either unavailable to the oil industry or unsuitable for oil transportation.

Mr. Pelley's conclusion is believed to have been based on an estimate made about August 1, 1940. It is believed to represent not only idle cars but also capacity which should be attained by more efficient use of those in service. The very substantial increase in use of tank cars since then plus the increased efficiency attained through installation of loading racks has reduced available capacity far below that point.

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Litigants Confer on Decree In Elkins Pipe-Line Suit

WASHINGTON, D. C., Sept. 16.—Settlement of the Elkins Act pipe-line "rebate" suits is expected very shortly unless there is some last-minute hitch. Preliminary negotiations have been completed, and attorneys for all oil companies owning stock in pipe lines are meeting here this week for what is hoped to be the final conference. The group will include about 150 attorneys, and the Department of Justice is now trying to find a room to hold such a large conference.

As outlined in the August 23 issue of The Oil and Gas Journal, Page 23, a single suit is to be filed in the District of Columbia against all pipe lines and companies controlling them, and at the same time the defendants will file an answer and will sign a consent decree. The Department of Justice will then withdraw the three test cases brought in other jurisdictions, and, presumably, there will no longer be any question of the legality of ownership of pipe lines by major companies. Once this matter is settled the department will resume attempts to obtain a consent decree in the so-called "Mother Hubbard" antitrust suit against the American Petroleum Institute and 22 major oil companies.

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Atlantic Coast Tankers Only One Less Than Year Ago

WASHINGTON, D. C., Sept. 16.—Only one less tanker was operating in the Gulf to Atlantic Coast trade on June 30, 1941, than was the case a year before, Sen. David I. Walsh of Massachusetts revealed late last week. In a letter to Ralph K. Davies, deputy petroleum coordinator, requesting an explanation of "facts" in his possession which he stated indicate that the gasoline shortage "scare" was completely unjustified, Senator Walsh quoted the "latest available information" from the Maritime Commission disclosing that 243 tankers were operating in the gulf to East Coast trade on June 30 as compared with 244 on June 30, 1940.

Taking into account the increased amount of petroleum which each tanker is permitted to carry since the lifting of the load-line restrictions, the senator said, a much larger amount of petroleum is reaching New England at the present time than was the case a year ago.

Paternal interest of Standard Oil Co. of California in the history and 30-year life of El Segundo, Calif., brought officials of the company to that city's anniversary party. Pictured at the celebration are George Simkins, refinery executive, and H. D. Collier, president. The company's refinery at El Segundo and the town were conceived simultaneously

This Week...

Some relief for the industry's equipment problem is provided by OPM's issuance of a priority rating of A-10 on materials for maintenance and repair.

●

Most of the district production committees are now working on a survey of material requirements for remainder of this year and 1942. Results will be the basis for negotiations between the petroleum coordinator and OPM.

●

Traffic departments of Mid-Continent oil companies are working for lower rail freight rates on used equipment. Movement of used equipment is at the highest level in history. Shortages of new materials are responsible.

●

Litigants are meeting this week in Washington, D. C., attempting to reach a satisfactory decree in the Elkins Act pipe-line suits filed a year ago by the Department of Justice. Early settlement is indicated.

●

Daily average crude-oil production of 4,027,650 bbl. for the week ended September 13 is the highest rate of withdrawal ever reported by the industry.

●

Service-station operators in Utah have adopted the 12-hour schedule for business reasons, not because of products shortage.

●

Several arrests have been made and others are likely in the investigation of proration violations in Kansas. Several thousands of barrels of oil are alleged to have been produced surreptitiously.

●

Exigencies of oil and gas transportation required the construction of 6,000 miles of new pipe lines during the first 9 months of the year, exceeding the record for a similar period in 1940 by 20 per cent.

●

The industry's suspicions that claims that 20,000 tank cars are idle are being confirmed by efforts to find them for immediate service.

●

The order blocking construction of all new plants considered nonessential to the defense program casts a cloud over refinery building plans. Refiners need relief in this matter if demands on their facilities continue to grow.

●

Lists furnished Senator Maloney's committee show the petroleum coordinator's staff to consist of 60 people whose salaries are more than $3,200 annually. Organization is not yet complete. Growth of personnel will continue. Scores of clerks and stenographers are members of the complete staff.

●

Reversal of flow through the Tuscarora line which, in the future will deliver crude from Negley, Ohio, to Bayway, N. J., instead of products to the western terminal, will provide 25,000 bbl. of oil daily to the seaboard refineries.

●

Senator Maloney's committee reported there is no East Coast petroleum shortage. Stocks of crude and products are 13 per cent below last year, shot back Deputy Coordinator Davies. Coordinator Ickes, vacationing in Spokane, Wash., chipped in with "persons in the East who contend there is no gasoline shortage may have to eat their words 6 months from now."

●

Representative Martin of Massachusetts, Republican congressional leader, called for removal of Coordinator Ickes and Deputy Davies.

●

SPAB Tuesday reaffirmed its decision against granting priorities on steel plates for the national defense crude-oil line. Further study will be given proposals to use pipe drawn from billets.

Ickes Expected to Challenge Maloney Committee's Action

WASHINGTON, D. C., Sept. 15. — Secretary Ickes returns to the Capital today to find the props knocked out from under his plans as petroleum coordinator for national defense, but if he runs true to form he will set to work immediately and vigorously to set them up again.

While he was vacationing in the West a special Senate committee was appointed to investigate the shortage of gasoline in the East, held hearings, closed the investigation, and reported that the shortage is only a shortage of surplus.

Also while he was away the president created the new Supply Priorities and Allocations Board with supreme power over defense projects, which at once decided that steel will not be made available to construct the 1,586-mile crude pipe line which was to have been the backbone of Mr. Ickes' plan for coping with the transportation shortage.

Those who know Mr. Ickes expect him to go into action. Certainly he will have words to say. If the Maloney committee does not reopen its hearings to permit him to sound off, he will issue a blast in some other way, charging the committee with the full responsibility in case it has miscalculated and a real shortage of petroleum products becomes felt in the East this winter.

The report of the Maloney committee probably has created more long-range problems for the petroleum coordinator than the action of SPAB. The public now feels that the threat of an oil shortage is not nearly so great as it had been led to believe, that it has been hoodwinked, and that there are ulterior motives or something decidedly "phony" behind the whole program. A cloud of distrust and suspicion has been thrown over the entire coordination plan, and it will be much more difficult to get voluntary cooperation from the consuming public and from oil distributors.

The Senate investigation will not mean, as some may have hoped, that the Office of Petroleum Coordinator will be abolished. The committee's report shows that without some coordinating effort there would have been or may still be great difficulties in obtaining maximum use of all possible means of transporting oil to the eastern states so, to that extent at least, the committee has justified the existence of the OPC.

●

Refusal of Steel For Defense Line Reaffirmed by SPAB

WASHINGTON, D. C., Sept. 16.—The Supply Priorities and Allocations Board Tuesday reaffirmed decision of last week to withhold the granting of priorities for steel plate required to construct the proposed $80,000,000 crude pipe line from East Texas and Illinois fields to the New York and Philadelphia, Pa., refining centers.

The action was taken following a meeting with Deputy Petroleum Coordinator Ralph K. Davies Monday. Mr. Davies met with the board for 3 hours for the purpose of explaining the pipe-line proposal to the SPAB members.

The board said further study would be given to the proposal for constructing the line with tubular steel drawn from billets instead of welded from steel plates.

PRIORITIES:

Answers to a few of the most pertinent questions asked about procurement of petroleum equipment

QUESTION: Does the recently issued M-36 mean that manila rope for bull ropes cannot be distributed without restraint to the petroleum industry?—J. W. T.

ANSWER: General Preference Order M-36 prohibits the sale of Class A or Class B manila cordage except for specified purposes, one of which is "Oil Wells—for use as drilling cables, catlines, spinning lines and torpedo lines."

QUESTION: Is there any advantage or disadvantage in contracting refinery maintenance work ordinarily done by the refinery construction force in so far as procurement of supplies is concerned?—H. O. R.

ANSWER: Disadvantage, unless the contractor happens to have supplies on hand which he won't sell unless he installs them. Refinery must get its own priorities, and going through a contractor means one additional step.

QUESTION: What steps are being taken to inform refiners where ordinary carbon steels may be used in place of the scarce alloyed steels?—J. L. D.

ANSWER: Several trade associations in the oil industry are working on this problem. OPM has a Division of Conservation and Substitution which assists where it can, and recently suggested ways of reducing amount of nickel steel in sucker rods.

QUESTION: What provisions are operative to keep a refinery from ordering excess materials for a job bearing or likely to bear on a high priority rating and using those materials for maintaining other equipment supplying only civilian needs?—W. Z. T.

ANSWER: Priority requests require an affidavit that the material is needed and will be used for the purpose specified. Violation is a criminal offense, and also the company may get no further supplies.

QUESTION: When and what priority rating can we expect for securing steel to be used in maintenance and repair of existing equipment?—H. D. S.

ANSWER: Priority rating of A-10 became effective September 9 on supplies of this type.

QUESTION: In issuing our own purchase orders to manufacturers for such materials as we may require in executing our customers' orders, we are experiencing considerable inconvenience, delay and expense in extending priorities to our manufacturers in the procurement of materials needed for customers' orders upon which priority rating certificate has been filed. The present procedure requires photostating Director of Priorities Order, with signed acceptance, for each of our purchase orders; a very expensive and cumbersome procedure. What form or forms can properly be used to accompany our purchase orders to our own manufacturers or suppliers for the purpose of certifying that our customer's priority certificate has been filed with us? There should be some form that will eliminate the cumbersome procedure of photostating original certificates. What is it?—W. D. M.

ANSWER: Presumably this question refers to project ratings on Form P-19-A. This form states: "Additional copies of this order may be secured from the Division of Priorities, Office of Production Management, Washington, D. C., or photostatic copies may be made and used by persons entitled to apply the preference rating."

QUESTION: Why has the British oil industry a high priority rating in obtaining equipment while American companies operating in the same foreign fields have no priorities?—T. L. P.

ANSWER: Complaints of equipment and operating companies alleging that British suppliers have received preferential treatment have been numerous. A "white paper" was issued last week by British authorities in this country declaring that materials are under rigid restraint to all consumers and that only industries essential to prosecution of the war are receiving preferential treatment. The oil industry would appear to qualify under that classification.

QUESTION: How can one get authority from any authorized source to ship oil-well equipment urgently needed to our agents in Trinidad, British West Indies?—A. A. D.

ANSWER: The first step would be to secure Department of State approval on the export order. The new A-10 rating applies to export equipment if it is for repair or maintenance. If conditions justify, a higher rating may be sought through use of Form PD-1 which should be filed with the Petroleum Coordinator, Department of the Interior Building, Washington, D. C.

QUESTION: In what bracket will pipe-line contractors be placed with regard to supplies and equipment?—M. E. C.

ANSWER: Priority rating of A-10 now covers material for repair and maintenance of crude and product lines. Steel for new projects must be allocated by the Priorities Division of OPM.

QUESTION: How is present oil production to be maintained if priority for oil industry does not include drilling materials?—K. E.

ANSWER: Equipment for drilling and exploration now qualifies for priority rating of A-10 under interpretation of Order M-32.

QUESTION: What, if any, priority number has been assigned wire rope for oil-field use?—G. J.

ANSWER: A-10, the same as for pumps and other repair and maintenance equipment.

QUESTION: As a public natural-gas utility supplying gas to small towns and municipalities, to what priority rating are we entitled in obtaining supplies, line pipe, meters absolutely necessary in the operation of our business, and how do we secure this priority rating? —J. W. W.

ANSWER: The gas-utility industry has no priority standing at the moment other than whatever the facts may justify in each individual application for materials. Reports from Washington this week indicate that the natural-gas industry will be assigned a permanent priority status in the near future. Meanwhile, applications for essential materials not obtainable from your regular source of supply without a priority rating should be made to the Office of Petroleum Coordinator, Washington, D. C.

QUESTION: What about pipe for pipe-line construction?—R. G. C.

ANSWER: Priority number of A-10 applies if for repair or maintenance. If for a new line, Form PD-1 should be used and application made to H. A. Gilbert, director of transportation, Office of Petroleum Coordinator, Washington, D. C.

QUESTION: What are the oil companies to do about getting priorities on new jobs and for maintenance?—J. A. C.

ANSWER: Nature of the new work will be determining factor but for maintenance supplies A-10 applies.

QUESTION: Is the petroleum coordinator's office attempting to obtain a blanket priority rating for the petroleum industry or is it waiting for the industry to present the case of its needs after which the whole story can be laid before priorities officials?—B. O. R.

ANSWER: There is no intention of having the oil industry classified as a defense industry (which would give it priority status automatically), nor of obtaining a blanket priority rating for the oil industry. Coordinator would not support an industry move for such status. Blanket ratings have been issued aircraft and a few other industries, but they have been abused and have not worked well. They are being restricted and may be revoked.

QUESTION: What is the priority status of consulting geological, geophysical and geochemical companies serving the oil industry in petroleum exploratory work in the matter of instruments, tools and chemicals?—J. W. M.

ANSWER: There is no special provision for such companies.

QUESTION: Who is required ot fill out PD-73? Is a PD-73 necessary on each transaction in steel or only on the first transfer from the producer to the distributor or fabricator?—W. J. D.

ANSWER: Steel Allocation Order M-21 requires a producer of steel to have a Form PD-73 for each delivery of steel, but a producer is considered to be the firm which makes finished or semifinished steel, not a concern which fabricates steel into oil equipment. After a distributor or fabricator obtains the steel he can deliver it without a PD-73.

QUESTION: What regulations on priorities apply to exporters of oil-field equipment? Are restrictions on equipment for export identical with those applying to domestic distribution?—V. E. H.

ANSWER: Exporters are subject to the same priority difficulties and requirements as domestic users, but before he can get a priority order an exporter must first obtain an export license from the Department of State.

Order Simplifies Procurement of Maintenance Equipment

By HENRY D. RALPH

WASHINGTON, D. C., Sept. 15.—Issuance of Preference Rating Order P-22, automatically giving an A-10 priority rating to all materials needed for maintenance and repair in the production, refining and transportation branches, has simplified the question of procuring equipment for the petroleum industry. No special form or application is required for this purpose, and nothing has to clear through Washington.

All an oil company needs to do is to order materials on the usual order form or by letter, and endorse the order with the language specified in Order P-22. The supply company then is required to give the order A-10 priority, and the supplier in turn may also obtain A-10 ratings on materials needed to fill such orders, using a similar endorsement procedure.

Heretofore it has been necessary to obtain an individual priority order on Form PD-1, so P-22 eliminates much red tape. The only check against abuse of the system is the requirement that copies of all orders and endorsements be kept on file, and OPM inspectors will make occasional spot checks to see that material is not ordered in excessive quantities nor used for purposes other than those stated. Priority orders so obtained are subject to all the laws and restrictions of other types.

The new Order P-22 names 20 industries eligible for these short-cut priorities, including "petroleum production, refining and transportation—plants and equipment used in petroleum production, refining and transportation." Drilling and exploration are considered parts of production. Marketing is not included, and PD-1 forms must still be used for this branch of the industry. The natural-gas industry is not named in P-22, but probably will be covered later by a blanket maintenance and repair order for the utilities industries.

A thorough study of the industry's equipment needs for the remainder of 1941 and 1942 is now under way in most of the five districts into which the country is divided by Secretary Ickes for administration of the petroleum coordination program.

The District 2 production committee has appointed an extensive list of subcommittees for states and fields embraced in its territory for the survey of material requirements and other phases of the coordination program.

State and field subcommittees of Districts 2 and 4 are working on a similar pattern of procedure. The next meeting of District 5's production committee will be held later this month and at that time organization for survey of material needs will be established.

Results of the surveys on material needs will be submitted to the petroleum coordinator's office for negotiations with priorities officials of OPM.

Other branches of the industry—refining, transportation and marketing—have not yet organized to the same extent as the production phase of the business in determining material requirements.

Obtaining Higher Rating

Where an A-10 rating is not high enough to obtain supplies in time to avoid a shutdown, Form PD-1 may be used to obtain a higher rating. However, all orders rated A-10 are classed as defense orders, and they must be accepted by persons able to fill them, and must be filled ahead of all "B," or civilian, ratings.

Order P-22 also permits the 20 listed industries to obtain supplies for emergency inventory, which means a minimum amount of material on hand to meet an actual or imminent breakdown.

Production, sales and consumption of equipment for the petroleum industry's repair and maintenance requirements is now and will be for the indefinite future guided by P-22. Text of the order is published herewith, except that the listing of 20 individual industries has been deleted.

958.1 Preference rating order.

For the purpose of facilitating the acquisition of material for the repair of the property or equipment of certain industries and services hereinafter specified, a preference rating is hereby assigned deliveries of material for such purpose upon the following terms:

(a) Definitions.

1. "Producer" means any individual, partnership, association, corporation, governmental unit, or other organization engaged in one or more of the following industries and services, and such other industries and services as may be added from time to time by supplement to this order: . . .

2. "Material" means any commodity, equipment, accessories, parts, assemblies, or products of any kind.

3. "Repairs" means only repairs needed because of an actual or imminent breakdown, from whatever cause, of a producer's property or equipment.

4. "Emergency inventory" means minimum inventory of material required to provide for repairs to meet an actual or imminent breakdown, from whatever cause, of a producer's property or equipment.

5. "Supplier" means any person with whom a purchase order or contract has been placed by a producer or any supplier for

(I) Material to be used for repairs;

(II) Material required for a producer's emergency inventory;

(III) Material to be physically incorporated in other material which is to be used for repairs or which is required for a producer's emergency inventory.

(b) Assignment of preference rating.

Subject to the terms of this order, Preference Rating A-10 is hereby assigned:

1. To deliveries to a producer of material required by him for repairs or for his emergency inventory;

2. To deliveries to a supplier of material which is, in turn, to be delivered to a producer for repairs or for his emergency inventory or to be physically incorporated in material to be so delivered.

(c) Persons entitled to apply preference rating.

The preference rating hereby assigned may be applied by

1. A producer;

2. A supplier, provided that he requires the material so purchased in order to make deliveries duly rated pursuant to Paragraph *b*.

(d) Application of preference rating.

1. A producer in order to apply the preference rating to a delivery of material to him must endorse the following statement on the original and all copies of the purchase order or contract for such material signed by a responsible official duly designated for such purpose by such producer.

"Purchase order for Repair or Emergency Inventory Preference Rating A-10 under Preference Rating Order P-22."

Such endorsement shall constitute a certification to the Office of Production Management that such material is required for the purposes stated therein. Any such purchase order or contract shall be restricted to material the delivery of which is rated in accordance herewith.

2. A supplier in order to apply the preference rating to a delivery of material to him must endorse the following statement on the original and all copies of the purchase order or contract for such material signed by a responsible official duly designated for such purpose by such supplier:

"Purchase order for material required to fill a duly rated order for repair or emergency inventory. This purchase order bears Preference Rating A-10 under Preference Rating Order P-22."

Such endorsement shall constitute a certification to the Office of Production Management that such material is required to fill an order placed by a producer or supplier duly rated in accordance herewith. Any such supplier's purchase order or contract shall be restricted to material the delivery of which is rated in accordance herewith.

3. A producer or supplier placing any such rated purchase orders or contracts and the supplier selling the material covered thereby must each retain endorsed copies of such purchase orders or contracts segregated from all other purchase orders or contracts for a period of 2 years from the date thereof for inspection by authorized representatives of the Office of Production Management.

(e) Restrictions on application of rating.

The preference rating hereby assigned shall not be applied

1. By a producer to obtain material in excess of his requirements for repairs or for his emergency inventory;

(Continued on Page 73

Illinois Chapter, A.P.I., Program Features Defense

By HARRY F. SIMONS

Officers of the Illinois basin chapter of the A.P.I. are: T. B. Steele, Kewanee Oil & Gas Co., Robinson, Ill., secretary and treasurer; C. J. Haas, Adams Oil & Gas Co., Centralia, Ill., incoming chairman, and Bart DeLaat, Pure Oil Co., Chicago, Ill., retiring chairman

ROBINSON, Ill., Sept. 16.—Nearly 100 members of the Illinois basin chapter of the American Petroleum Institute attended the organization's annual meeting here Saturday and heard a program in which national defense was stressed. Due to the present press of work in the basin area, the attendance fell considerably short of the 150 expected at the meeting.

Two of the speakers on the program are connected with the Government's defense effort. At the afternoon session, Capt. Edward J. Lorenz, attack squadron, Scott Field, Illinois, discussed "National Defense and the Oil Industry," while at the evening session A. H. Crawe, special agent, Federal Bureau of Investigation, Springfield, Ill., talked on "The Prevention of Industrial Sabotage." Technical papers by three basin oil men filled out the program. These included "Gas Gathering and Discharge Systems, Louden Pool Repressuring Project," by J. R. Randolph, Carter Oil Co., St. Elmo, Ill.; "Completion Practices in the Wabash Valley of Illinois," by F. C. Ploeger and Jerry Vaughan, of the Sun Oil Co., Evansville, Ind., and "Reconditioning of Old Wells," by H. W. Ross, Dowell, Inc., Tulsa.

The morning session, which was to have been presided over by E. J. Reading, was abandoned when members were late arriving, and the officers and advisory board of the chapter held a session of the executive committee. In the afternoon a short meeting of the entire body was held for the election of officers prior to turning the meeting over to Anthony Keating, Robey-Keating Drilling Co., who presided at the technical session.

Election of Officers

Officers chosen for the coming year are: C. J. Haas, Adams Oil & Gas Co., Centralia, Ill., chairman; E. J. Reading, Sun Oil Co., Evansville, Ind., first vice chairman; J. D. Sanford, Rockhill Oil & Gas Co., second vice chairman. Bart DeLaat, Pure Oil Co., Chicago, Ill., is the retiring chairman. The new members of the advisory board include H. F. Sackett, Fisher Oil Co.; W. I. Lewis, drilling contractor; J. B. Whisenant, Whisenant & Trenchard; Anthony Keating; A. H. Bell, state Geological Survey, and Max Sherwood, Shell Oil Co., Inc. Ralph Damp, division manager, Carter Oil Co., Mattoon, Ill., was the chairman of the nominating committee.

Much interest was evidenced in the talk by Mr. Crawe, principally because many of those present were connected with firms which are in some way tied up with national defense. Introduced by Retiring Chairman DeLaat, the speaker outlined the history of sabotage and pointed out that it had been growing steadily as a major war weapon in the past 25 years. Principal objectives of the saboteurs are to impede the manufacture and transportation of essential war supplies and to destroy the morale of the civilian population.

Mr. Crawe pointed out that there are between 13,000 and 14,000 plants in the country actively engaged in defense work and that many of these had given little attention to the prevention of sabotage. Guarding of blueprints, working models, precision tools, and technical instruments is essential to prevent major damage. The F.B.I. has been directed by the president to investigate cases where there is suspicion of sabotage, espionage, or violation of the Neutrality Act. The agency also steps in at the request of the Army or Navy or the operator of the plant to see if the proper safeguards have been taken. In case of damage to a plant or its products, the bureau takes charge of the case.

Booklet on Sabotage Protection

Investigation of numerous plants by the bureau has led to the issuance of a booklet, "Suggestions for Protection of Industrial Facilities," which can be obtained by plant managers. Contents of the book were briefly summarized by Mr. Crawe, who pointed out that it would be impossible to stop all sabotage but that it could be prevented to a great extent by guarding against disloyal employes, investigation of employes' background, and the establishment of an identification system for employes. Floodlighting, adequate guards and the establishment of restricted areas are also necessary, he said. Knowledge of where an employe was during the first World War is important as is the complete destruction of all waste paper. This latter, he said with a grin, has been most useful to the F.B.I. in obtaining leads.

At the present time there is no effective sabotage ring in operation although there is one ready to function. Since being charged with the work the F.B.I. has investigated 80,000 cases. One of the principal dangers to be guarded against is the spreading of false reports about sabotage as civilian morale is impaired when rumors of extensive damage are spread.

Oil in Blitz Warfare

Captain Lorenz pointed out that the continued operation of planes, tanks, and trucks was entirely dependent on a continued flow of petroleum. Also that motorized equipment was fast becoming the only practical means for military transportation. The striking power of the air force has made rail transportation in a war area obsolete, he said. Conservation of motor fuel and petroleum products is essential in the western part of the country if a serious shortage on the eastern coast is to be averted, Captain Lorenz added.

Mr. Ross pointed out in his paper that due to the increased demand for petroleum and the reduction in the amount of steel available to the industry, it will be necessary to get more oil out of the wells now operating. Blocking of formation pores by mud and incomplete acidization of the pay formation is preventing much oil from reaching well bores; gyp and paraffin deposits in wells are also robbing the producer of much oil. Proper acid treatment and reconditioning of these holes would result in increased production, Mr. Ross said.

The remedy used depends upon conditions existing in the well, facilities for meeting these conditions, and the strength of the demand with reference to the reward expected. Blocking off a permeable formation while a less permeable pay zone is acidized is one method while the use of a jet gun is another. Soluble gyp can be easily removed by acid while the insoluble type can have the formation removed from around it, thus allowing the gyp to fall to the bottom of the hole.

The paper by J. R. Randolph brought out the essential parts of the gas-gathering system in the Louden field, while the paper by F. C. Ploeger and J. R. Vaughan described the completion problems in the Wabash Valley facing operators in one of the most active areas in the state.

Chairmen and authors of the meeting: Anthony F. Keating, Robey-Keating Drilling Co.; Jerry Vaughan, Sun Oil Co., Evansville, Ind.; J. R. Randolph, Carter Oil Co., St. Elmo, Ill., and E. J. Reading, Sun Oil Co., Evansville, Ind.

STATE CAPITALS...

TEXAS

COL. ERNEST O. THOMPSON, chairman of the Texas Railroad Commission, announced last week that he plans to return to his full-time duties with the commission upon retirement from army service November 11, barring entry of the United States into war. Colonel Thompson is now serving with the federalized National Guard on maneuvers in Louisiana, and has been in command of the 141st Infantry since his transfer from the Quartermaster Corps.

Colonel Thompson has kept in close touch with developments in the oil industry, it was indicated by his public support of a suggestion made by George A. Hill, Jr., president of the Houston Oil Co., that the federal Government itself make use of empty tank cars in transporting gasoline and thus leave other facilities available for service to the general public.

PRODUCTION OF CRUDE OIL in Texas during July was 150,673 bbl. less than pipe-line runs and other disposals out of a total turnover of 40,790,523 bbl. and lease storage of crude oil decreased during the month by 148,378 bbl. to leave a total of 4,307,553 bbl. at the start of August according to a report released by the Railroad Commission. The state's allowables were underproduced 3.62 per cent or 1,473,374 bbl., while the June underproduction was 3.92 per cent.

The 6,435 operators reporting on 18,511 leases showed the 40,790,523-bbl. storage was divided by districts:

Southwest Texas, 731,624 bbl.; Gulf Coast Texas, 667,034 bbl.; East Central Texas, 731,624 bbl.; East Texas, 930,106 bbl.; West Central Texas, 234,755 bbl.; West Texas, 897,520 bbl.; North Texas, 505,574 bbl.; Panhandle, 262,687 bbl.

NOTICES OF HEARINGS on the following matters were posted by the Railroad Commission:

Sept. 22—Special production rules for the Salt Creek area in Brown County.

Sept. 22—Repressuring the Akin, Dimock and Cosley's Dodson, Glass and Oates leases and W. E. Production Co.'s Glass lease in the B.B.B.&C. Survey A-28 in Wichita County.

Sept. 22—Special rules for the West Brownwood field of Brown County.

Sept. 23—Special rules for the Burns-Ragland pool of Young County.

Sept. 23—Special rules for the Burns-Larimore pool of Young County.

U. S. SEN. LEE O'DANIEL broadcast by transcription to his Texas constituents that the proposed $80,000,000 pipe line from Texas to the Atlantic seaboard was an enormous natural gas pipe line "all dressed up in the lily-white robe of national defense." He opposed the construction of a gas line on the grounds that such a line would rob Texas of her natural resources and would remove the attraction of cheap fuel for industry which Texas might otherwise offer.

"In my opinion," he said, "Texas has already been robbed of too much of her great natural resources, and the wealth of Texas pumped into the big rich states of the East, and it is time to call a halt."

The senator also pointed to the findings of a recent Senate investigating committee in regard to the gasoline shortage on the eastern seaboard and declared railroads are equipped to supply 200,000 bbl. of petroleum products daily from Texas to the East.

HIGHWAY FINANCING PROBLEMS neared a legislative settlement without change in the gasoline tax after the Texas House of Representatives, in special session, passed and sent to the senate a road bond bill which, in effect, would revive an act of 1939, and voted to adjourn this week. The bill passed by the house was introduced by Rep. Lonnie Alsup of Carthage.

Previously the senate passed a road bond assumption bill which followed much of the program of Gov. Coke Stevenson providing for the building by the state of a farm-to-market road system and the acquisition of right-of-way by the state with surplus gasoline tax funds. Some members of the house considered the Alsup bill a compromise with the senate measure, and gave their bill a good chance of passage by the senate.

The house adjournment motion must also have senate approval.

Decision of the legislators to adjourn after providing for the road bond tangle eliminates the possibility that other matters of concern to the Texas oil industry might be considered.

NEW MEXICO

OIL FIELDS OF SOUTHEAST NEW MEXICO, visible for miles from the ground and an excellent guiding beacon for airplanes because of the burning gas flare at every well, were no hitch to last week's state-wide mock-wartime blackout. The flares were snuffed out completely for the first time since the wells were put on production. So effective was the oil-field blackout that airmen reported they could not see a glimmer of light at any of the fields, and bombers missed the town of Hobbs by miles. The bomber assigned to the Hobbs objective was forced as far off its course as Midland, Tex., because of the complete blackness of the area for miles around. Production of waste gas is controlled in the state under laws which provide a penalty for production of excessive amounts of gas per barrel of oil.

KANSAS

FEDERAL AND STATE investigation of alleged illegal production practices in the Kansas oil fields resulted in the arrest of six persons last week and the charge that evidence showed 421,000 bbl. of oil has been produced illegally in the state. Former state Judge J. G. Somers, of Newton, Kans., was named by Andrew S. Schoeppel, chairman of the state Conservation Commission, to direct an investigation into criminal violations of the proration laws during the past 3 or 4 years.

Representatives of the Department of the Interior from Washington, D. C., and of the Federal Tender Board from Kilgore, Tex., also have been investigating oil-field production conditions as has the Kansas Bureau of Investigation. Charges filed ranged from embezzlement of oil to criminal thefts of oil-field equipment. Mr. Somers also declared that 1,500,000 bbl. of oil had been overproduced in the last 4 or 5 years.

HEARING TO DETERMINE Kansas' crude-oil allowable for October and for gas production from the Hugoton field for the next 6 months will be held at Wichita, Kans., September 23, the Corporation Commission announced last week.

THE COMMISSION ALSO ORDERED a hearing September 23 at Wichita on an application of the Cities Service Oil Co. for the approval of a potential redetermination in the Wilkins pool, Ellsworth County. Principal producers in the pool besides Cities Service are C. E. Ash, Central Petroleum Co., Derby Oil Co., Duwe & Farris, Gulf Oil Corp., F. H. Hollow, Mudge Oil Co., Phillips Petroleum Co., Skelly Oil Co., Transwestern Oil Co. and Vickers Petroleum Co.

CALIFORNIA

STUDY OF CONDITIONS in the California gas industry, especially on production and transportation, started several months ago is progressing but it may be several months before a policy, based on results of the survey, can be formulated. Prof. John F. Dodge of the University of Southern California who has been retained by the California Railroad Commission and the Department of Natural Resources to make a complete study has been working on the problem for several months and still has some work ahead. The study now being made is to determine as far as possible the probable future production of natural gas from known reserves and to ascertain the most advantageous use to which it should be put under conditions existing at the time of production.

California gas companies are public utilities and are under jurisdiction of the Railroad Commission. Several of the gas companies wish to discontinue deliveries of natural gas where extremely low rates prevail.

LOUISIANA

A SPECIAL REPORT from the office of state Atty. Gen. Eugene Stanley of Louisiana, being prepared for the next meeting of the state Mineral Board, will show that the state government owns more oil lands than any private operating company. This was revealed by Philip Ginsler, special assistant to Mr. Stanley, who has been preparing the report.

Mr. Ginsler also recalled that eight suits are pending in state and federal courts for the return to the state of leased oil lands, mostly on grounds that the property has not been developed according to specifications. Already, he said, the state has recovered 510,000 acres in Terrebonne Parish from an original 528,000-acre lease and on the remaining 18,000 acres wells are producing 4,000 bbl. of oil a day. In St. Mary Parish the state has recovered all but 20 acres of a 7,680-acre leased tract and two wells are producing on the remaining 20 acres, he said.

The Mineral Board announced at the same time that nine tracts of state lands had been leased for total cash bonuses of $177,660. The board previously had rejected offers on the tracts and readvertised for bids.

the OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

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Why the Delays?

Every day brings additional exhibits showing that the petroleum industry does not have the organization it should have to cope with current problems and those in the making.

Operators may get satisfaction in reading reports of charges and countercharges coming from legislative and administrative officials who have delegated or assumed responsibilities as regards oil.

But that is not all that they are getting. They are gaining the suspicion of millions of their customers who are wondering why a Senate committee had to go to the railroads to find out what the tank-car situation is when most of the cars are owned by the oil companies.

The same petroleum consumers have long wanted comprehensive information as to tankers and pipe lines but the owners generally have been content to let the answers come from those who from the same witness chair predict both feasts and famines in petroleum supplies due to transportation conditions.

Many pass the responsibility to the 245 who were appointed by the coordinator to represent the petroleum industry. Some of the committees within this large representation are functioning. Generally after 2 months little has been accomplished.

If these committees are to be nothing more than an advisory stalking-horse for the coordinator's several departments, then they cannot give the industry the leadership it needs now.

At the time the petroleum coordinator's office was established, many favored a small representative group of leaders which could speak for all operators whenever necessary.

This was the plan followed in the Temporary National Economic Committee and the Cole committee investigations. These committees, who in the end were thoroughly sold on the accomplishments of the petroleum industry and its right to run its own business, did not have to look to outsiders for their information.

There is much that needs to be done quickly. Rising labor and material costs and higher taxes make it mandatory that many of the industry's markets be advanced. This need has been discussed at Washington only by small groups representing sections or products.

Highly important changes are being made in transportation affecting oil supplies of the eastern part of the United States. Crude oil may shortly be delivered at many refineries by tanker, pipe line and tank car at transportation costs ranging from 50 cents to $2 per barrel. The same divergence will apply to finished products.

How are prices to be determined under these conditions? If the industry does not solve this problem the Government will come in with its ideas and there will be the start of permanent price control.

More important than anything else is the matter of materials to support oil operations. Manufacturers and suppliers are doing what they can to bring the industry's position, which daily becomes more critical, to the attention of agencies that are responsible for governmental policies. The coordinator's office wants to be helpful.

But the support of all operating divisions is necessary. They, alone, know what they must have in supplies for their fields, refineries and plants over the remainder of this year and next. To many this situation is already serious and the entire industry is in danger of being out on a priority limb shortly.

Oil problems arising from the emergency programs are just starting. The last has not been heard of rationing, tanker shortages, defense pipe lines, price fixing and other developments of an economy dominated by a world war. In giving full cooperation to the Government's plans, the petroleum industry must be in a position to present its own case fully at all times.

Reservations Pouring In For Journal's A.P.I. Special

ADVANCE reservations that have been made to date, with yet 6 weeks until the convention opens, indicate that a capacity crowd will enjoy the de luxe splendor of The Oil and Gas Journal's special train to San Francisco, Calif., for the American Petroleum Institute's twenty-second annual meeting.

Following the custom of previous A.P.I. West Coast conventions, The Oil and Gas Journal has arranged with the Santa Fe railway to operate a special section of the latter's famous streamlined Super Chief from Tulsa and Chicago to accommodate members attending the 1941 San Francisco convention. In arranging for this train, the Journal has been mindful of the fact that many friendships are made and renewed on the transcontinental convention journeys, which has been the reason for securing the utmost in travel luxury for the convenience and enjoyment of A.P.I. members. Normally, the Super Chief operates twice weekly between Chicago and Los Angeles, but special arrangements have been made by the Journal to operate this train direct to San Francisco, with the schedule being planned as swiftly as the regular run, which is the fastest of transcontinental trains. A section of The Oil and Gas Journal A.P.I. Special will leave Chicago at 11:45 a.m., October 31, and another section from Tulsa at 4 p.m., October 31, the two sections to meet at Newton, Kans. The streamliner will be operated through to San Francisco.

The equipment of the special train will be the finest that can be secured. It will be all-Pullman, with practically every type of Pullman accommodations, from de luxe double bedrooms to modern-type lower berth. A modern lounge car will be included and, of course, a dining car that will serve Fred Harvey meals. All coaches will be of lightweight stainless steel.

Reservations from all parts of the country have been received to date. Schedules have been arranged so that convenient connections are made at Chicago from trains from New York City and other eastern points, with passengers from the South, Southwest and Middle West joining the special at convenient points en route.

Accommodations on The Oil and Gas Journal A.P.I. Special are rapidly being taken, and in order that no one be disappointed in securing the type of accommodations desired, it is urged that reservations be made as quickly as possible through the office of The Oil and Gas Journal, Tulsa, or through the General Passenger Agent, Santa Fe Railway, Tulsa.

View of Santa Fe Super Chief, counterpart of The Oil and Gas Journal A.P.I. Special which will carry convention travelers to San Francisco

Fifteen Oil Men Added To District Committees

Fifteen oil men were added to the five industry district committees, spreading representation on the groups for petroleum coordination to new factors in the business. The full membership of all district committees, named to cooperate and consult with federal officials on gearing fuel supplies to national defense and civilian needs, now includes about 245 oil men from all parts of the country and divisions of the industry.

The new appointments announced in Washington, D. C., by Ralph K. Davies, deputy coordinator, are as follows:

District 1, transportation committee: A. William Rowe, district sales manager, Cities Service Oil Co., Boston, Mass.; R. R. Griffin, vice president, Shell Oil Co., New York City.

District 3, transportation committee: J. R. Parten, chairman of board, Premier Oil Refining Co., Longview, Tex. (Mr. Parten was transferred from District 3 marketing committee.)

District 4, refining committee: E. S. Holt, vice president, Utah Oil Refining Co., Salt Lake City, Utah; F. L. Perry, Perry Petroleum Co., Denver, Colo. Transportation committee: Kenneth W. Davis, president, Cut Bank Refining Co., Cut Bank, Mont.; C. J. Westcott, president, Westcott Oil Co., Boise, Idaho. Marketing committee: D. F. Benton, Standard Oil Co. of Indiana, Denver, Colo.; W. J. Dineen, president, Dineen Co., Cheyenne, Wyo.

District 5, production committee: W. C. Whaley, Barnsdall Oil Co., Los Angeles, Calif.; Lloyd Williamson, California Star Oil Co., Los Angeles. Refining committee: A. M. Kelly, Richfield Oil Co., Los Angeles; S. J. Dickey, General Petroleum Corp., Los Angeles. Marketing committee: C. A. Johnson, president, Socal Oil & Refining Co., Los Angeles (Mr. Johnson was transferred from the refining committee); A. H. DeFriest, General Petroleum Corp., Los Angeles.

I.P.A.A. Meets in Oklahoma City To Discuss Program and Policy

Russell B. Brown, general counsel for the Independent Petroleum Association of America, upon his arrival in Oklahoma City from Washington, D. C., for a meeting of the association's executive committee gave out a statement summarizing the Senate investigation of petroleum supplies on the Atlantic seaboard and expressed the opinion that the most pressing need of the petroleum industry and the agencies seeking to steer the industry in the defense program is a simple working plan.

Mr. Brown suggested closer cooperation between various branches of the industry and stressed that the federal agencies handling defense should get together on a unified program. He called particular attention to the division of authority given to Secretary of the Interior Harold L. Ickes, Leon Henderson, Ralph Budd and Admiral Emory S. Land of the Maritime Commission.

In his statement, Mr. Brown said there is no "present" shortage of products on the coast, but "there is a transportation problem . . . the solution of which may involve many changes. There may be a shortage in the future if these changes are not made."

New Wage and Hour Regulations On Record Keeping Published

Revised regulations on how to keep wage and hour records were published last week by the Wage and Hour Division of the United States Department of Labor. The new regulations were effective September 15, 1941. They were drawn up as a result of petitions filed by a number of large employers more than a year ago, and, according to Gen. Philip B. Fleming, wage and hour administrator, were designed in part to simplify payroll records of corporations paying semi-monthly instead of weekly.

Among simplified regulations for such employers is a provision that earnings may be recorded on a daily rather than a total weekly basis.

However, the regulations also require some additional records to be kept showing total wages paid executive, administrative, professional employes and outside salesmen not within the wage and hour requirements of the law. Previously only the name, address and occupation of such employes was required.

Also, it is now required that each employer shall "preserve for at least 2 years from the last date of entry the originals or true copy of any and all customer orders or invoices received, incoming or outgoing shipping or delivery records, as well as all bills of lading, and all billings to customers (other than cash) which the employer retains or makes in the course of his business or operations."

A number of other minor changes were made.

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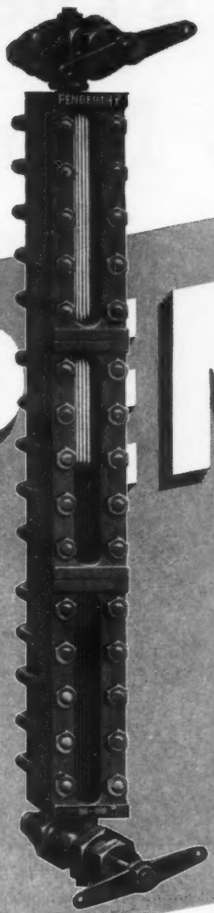

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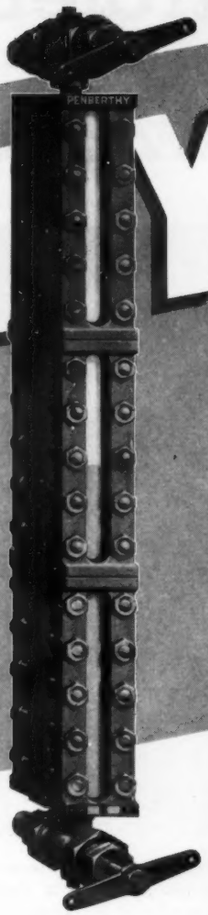

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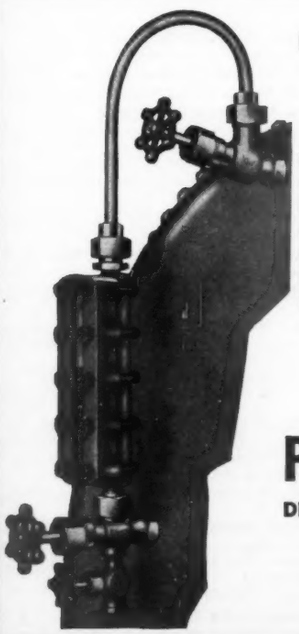
LIQUID LEVEL GAGES *meet your requirements*

Liquid shows black—empty space shows white. Preferred wherever liquid level must be easily and positively visible . . . and when liquids are under high pressure or at high temperature.

All Penberthy Gages conform with A. P. I.—A. S. M. E. requirements.

Used to observe color and density of liquids under high pressures, and/or temperatures. Construction is exceptionally rugged . . . similar to Reflex types.



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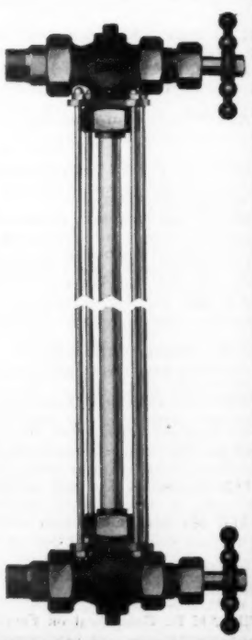
Made of Chromium-molybdenum alloy temperature-resisting steel, extra heavy throughout. Stainless steel trimmed. Tubular glass type gages also available in various other metals suitable for practically all conditions.



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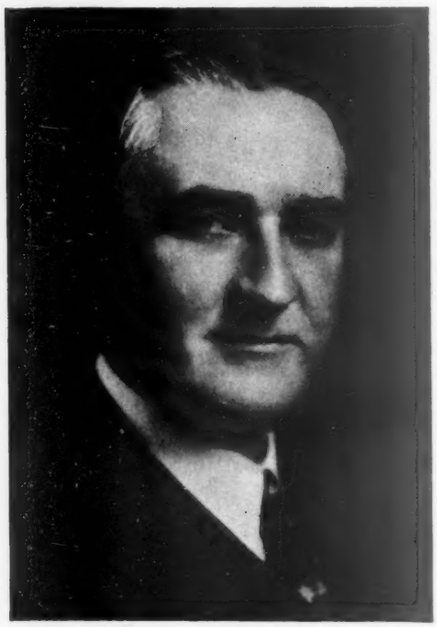
Petroleum Coordinator's Staff Now Numbers 60 Key Men



Wirt Franklin, Ardmore, Okla., has been confirmed as director of production for District 2. During the NRA period he was a member of the Planning and Coordination Committee

WHO'S WHO ON THE PETROLEUM COORDINATOR'S STAFF

Listed on these pages are the names and titles of three score men and women who comprise the present personnel of the petroleum coordinator's staff. This list, which will be amended by additional personnel, includes only the names of those receiving compensation of $3,200 per year or more on duty in Washington, or in the various district offices now being established. The accompanying report is based on information furnished the special Senate committee which recently completed an investigation of oil supplies in eastern states.

Former employment of each of the members of the staff is listed.

M. J. Foley, Casper, Wyo., formerly proration umpire for the Salt Creek (Wyoming) field, has been made director of production for District 4 since the accompanying list was compiled

DAVIES, RALPH K.: Deputy Petroleum Coordinator for National Defense
Formerly: Vice president and director of the Standard Oil Co. of California.

MARSHALL, J. HOWARD: Chief Counsel
Formerly: Partner in the law firm of Pillsbury, Madison, and Sutro, San Francisco, Calif.

WESTLAKE, STANLEY L.: Special Consultant on Pipe Lines
Formerly: Chief engineer, Ajax Pipe Line Corp. and Oklahoma Pipe Line Co., Tulsa.

HOLLAND, GEORGE W.: Special Assistant to the Deputy Coordinator
Formerly: Director of the Petroleum Conservation Division, Department of the Interior, Washington, D. C.

DeGOLYER, EVERETTE L.: Director of Conservation
Formerly: Consulting petroleum engineer; in business for self.

FREY, JOHN W.: Director of Marketing
Formerly: Associate director of the Petroleum Conservation Division, Department of the Interior, Washington, D. C.

ALLEN, ROBERT E.: Director of Production
Formerly: Chairman and executive, Petroleum Conservation Board, Calgary, Canada.

GARY, WRIGHT W.: Director of Refining
Formerly: In business for himself engaged in the special refining and development of crude oil.

SWANSON, EDWARD B.: Director of Research
Formerly: Associate director of the Petroleum Conservation Division, Department of the Interior, Washington, D. C.

GILBERT, HENRY A.: Director of Transportation
Formerly: President of Oil Transfer Corp., New York, N. Y.

ARNOLD, WILLIAM S.: Special Assistant to Deputy Coordinator
Formerly: Executive of Guyer, Cornell, and Newell, New York, N. Y.

ROBINSON, PHILLIP M.: Assistant Director of Refining
Formerly: Petroleum consultant, Office of Production Management, Washington, D. C.

CROSTHWAIT, STANLEY W.: Executive Officer
Formerly: Assistant to the Commissioner of Indian Affairs, Department of the Interior, Washington, D. C.

CRAMPTON, WILLIAM D.: Consultant on Foreign Shipping
Formerly: Managing director and vice president, Standard Francaise des Petroles, Paris, France, S. A.

SCHILTHUIS, RALPH J.: Assistant Director of Production
Formerly: Supervising engineer, Humble Oil & Refining Co., Houston, Tex.

STENTZ, STURGIS L.: Assistant Director of Production
Formerly: Sales manager, National Tank Co., Tulsa.

CRAGIN, ROBERT B.: Assistant Director of Refining
Formerly: Sales and contact engineering—process engineering in petroleum refining, M. W. Kellogg Co., New York, N. Y.

AMBROSE, OLIVER S.: Assistant Director of Research Division
Formerly: Petroleum engineer, Tide Water Associated Oil Co., New York, N. Y.

SNODGRASS, CORNELIUS S.: Assistant Director, Foreign Division
Formerly: Foreign Intelligence, U. S. Navy Department, Washington, D. C.

IDE, HERBERT C.: Assistant to the Deputy Coordinator
Formerly: Assistant to senior vice president and director of Standard Oil Co. of California.

FRIEDMAN, ROBERT E.: Assistant Solicitor
Formerly: Detailed from the Office of Solicitor, Department of Interior.

HUDSON, DAVID M.: Assistant Solicitor
Formerly: Detailed from the Office of the Solicitor, Department of Interior.

DENIS, CHARLES R.: Chief, Fuel Oil Section
Formerly: Assistant division manager, Gulf Oil Corp., Boston, Mass.

FOULDS, NED F.: Chief Marketing Analyst
Formerly: Partnership in the company of the Stratford Sales Service, Meridian, Conn.

BALZER, VERNON W.: Refining Material Expert
Formerly: Industrial engineer in charge methods, planning, and plant layout, Ford Instrument Co., Long Island, N. Y.

RUSSELL, RALPH P.: Chief, Rail Transportation Section
Formerly: Superintendent of the car service of the Pennsylvania Railroad, Philadelphia, Pa.

SESSIONS, GORDON M.: Assistant to the Deputy Coordinator
Formerly: Research man and publicity director, Citizens Public Expenditure Survey, Board of Trade, Chicago, Ill.

MATHER, HOWARD T.: Assistant to the Deputy Coordinator
Formerly: Assistant to the vice president and general counsel, Case, Pomeroy, & Co., Inc., New York, N. Y.

YOCOM, HERBERT A.: Director of Information
Formerly: Worked as wire editor, reporter, and correspondent in Reno, San Francisco, and Washington, for the Associated Press.

BEST, PAUL A.: Marketing Specialist
Formerly: City sales manager, Texas Co., Seattle, Wash.

THOMPSON, GLENN D.: Assistant to the Executive Officer
Formerly: Personnel officer, Public Works Administration, Federal Works Agency, Washington, D. C.

BRIGGS, GEORGE H.: Information Specialist
Formerly: Legislative Service, St. Paul, Minn. Worked for himself.

DAHLGREN, ELMER G.: Senior Petroleum Development Analyst
Formerly: Gas valuation engineer, Securities and Exchange Commission, Washington, D. C.

HOFFMAN, MALVIN G.: Petroleum Production Analyst
Formerly: Research engineer, Geophysical Service Corp., Tulsa.

MAYO, JOHN E.: Marketing Specialist
Formerly: Supervising the liquidation of closed banks. Federal Deposit Insurance Corp., Washington, D. C.

ADAMS, FRANK C.: Information Specialist
Formerly: Owned and operated general publicity Adams Advertising Agency, Austin, Tex.

WYE, ERNEST A., JR.: Economic Analyst
Formerly: Production allocation analyst, Standard Oil Co. of New Jersey, New York, N. Y.

DRACH, GERTRUDE M.: Petroleum Development Analyst
Formerly: Business specialist in Office of Price Administration and Civilian Supplies, Washington, D. C.

DUMBROS, NICHOLAS G.: Petroleum Development Analyst
Formerly: Inspection and consideration of application to export petroleum products, Office of Administrator of Export Control, Washington, D. C.

McCABE, RICHARD C.: Marketing Analyst
Formerly: Petroleum industry analyst, Bureau of Foreign and Domestic Commerce, Washington, D. C.

KURTZ, JOHN D.: Associate Petroleum Expert Engineer
Formerly: Territorial comptroller assistant on cargo, Atlantic Refining Co., Philadelphia, Pa.

NELSON, LOLA M.: Assistant to Executive Officer
Formerly: Junior administrative assistant, Petroleum Conservation District, Kilgore, Tex.

WEST, GERALD M.: Chief, Budget and Accounting Division
Formerly: Junior fiscal accountant, Office of Secretary, Department of Agriculture, Washington, D. C.

District Office Personnel

REGION 1—NEW YORK CITY

WILSON, DUSTIN W.: District Director of Refining
Formerly: Consulting engineer, M. W. Kellogg Co., New York, N. Y.

SPINER, LOUIS H.: District Director of Marketing
Formerly: Executive assistant to the president, Laclede Gas Co., Laclede Gas Building, St. Louis, Mo.

WYLIE, JAMES J., JR.: District Director of Production
Formerly: Examination and reports upon geology and value of oil and gas properties located throughout the United States; Huntley and Huntley, Geologists and Engineers, Grant Building, Pittsburgh, Pa.

HEISON, WALTER J.: Office Manager
Formerly: Junior administrative assistant, Fish and Wildlife Service, Department of the Interior, Minneapolis, Minn.

REGION 2—CHICAGO

PETTY, EARL: District Director of Refining
Formerly: Technical executive, American Locomotive Co., New York, N. Y.

FRANKLIN, WIRT: District Director of Production
Formerly: Has been engaged in the oil business for self since 1913.

DuMONT, WALTER: District Director of Transportation
Formerly: Petroleum transportation work; Pure Oil Co., Chicago, Ill.

WADSWORTH, HAROLD L.: Assistant District Director of Production
Formerly: President of Associated Petroleum Co., engaged in production work, Detroit, Mich.

NEWCOMBE, ROBERT B.: Chief Development and Production Analyst
Formerly: Consulting geologist, 901 North Otillia Street, S.E., Grand Rapids, Mich.

REGION 3—HOUSTON

VAUGHN, GRADY H.: District Director of Production
Formerly: Engaged in business for self as drilling of oil; oil producer and owner of oil properties.

GRANGER, GORDON T.: District Director of Refining
Formerly: Superintendent of refinery; manager of operations, Barco Oil Co., Corpus Christi, Tex.

BUCK, E. O.: Assistant District Director of Production
Formerly: Consulting petroleum engineer and geologist for self and gas laboratories.

BRANN, EMMETT H.: Assistant District Director of Production
Formerly: Oil producer engaged in business for self, Shreveport, La.

REGION 5—LOS ANGELES

GARRETSON, CHARLES B.: District Director of Marketing
Formerly: Executive secretary, Fair Practices Association, 631 Edison Building, Los Angeles, Calif.

EASTON, EDWARD E.: Production Specialist
Formerly: Checking producing oil leases in California since 1930.

AT LARGE

KNOWLES, RUTH SHELDON: Petroleum Specialist
Formerly: Past 4 years has been engaged in popular and technical writing pertaining to the oil industry.

Nation Depends on Pipe Lines In Defense Program

FINNEY STATEMENT:

(Continued from Page 55)

project meet the test of soundness in ordinary times as well as of usefulness in the present emergency. Any unit seeking this business should be asked to provide transportation of petroleum and its products that is safe, sure, and continuous at the lowest possible cost with a reasonable profit to the owners consistent with the investment. This test has been applied to several of the new pipe lines now under construction and can be used to rule out others which hope to profit during the emergency alone. With this basic program, we believe the pipe-line companies can continue to do their part in improving the transportation situation, working in full cooperation with the railroad companies and tanker owners so that a combined effort will deliver all of the product where and when needed.

HANCOCK STATEMENT:

(Continued from Page 54)

energy, there are also uses in the synthetic chemical industry which are rapidly growing in importance. Natural gas is being used in large quantities for the manufacture of a long and rapidly growing list of products which are obtainable more economically when gas is used as the process material. Some of these which are produced from the higher hydrocarbon components are not obtainable commercially from any other source. Many of these products are considered strategic raw materials in the present national-defense preparation. The industry is also engaged in the production of large quantities of liquid hydrocarbons for use in the manufacture of aviation and other grades of engine fuel as well as for industrial heating purposes in plants engaged in the production of defense materials.

While engaged in the extraordinary activities necessary in the performance of its function as an important supplier of fuel and other products in national-defense preparation, the natural-gas industry is also proceeding with the conduct of its regular and expanding business of serving gas to nearly 8,000,000 individual customers in homes and in plants and service establishments which meet the needs of large sections of our civilian population. This type of service is likewise essential to the general welfare and it would not be in the public interest to bring about its reduction by diverting facilities to the serving of the new requirements of a defense character. Therefore, the latter, much of which is of doubtful performance or of known impermanence, becomes additive, under some service conditions, to the requirements of the former class of customers. To the extent that such superimposing of the two types of requirements occurs, there is required the necessary expansion of facilities from producing formations to the places of delivery to customers or the adoption of alternative methods of supplying the aggregate requirements.

The natural-gas industry is demonstrating its willingness to voluntarily assume the full measure of its responsibilities and its ingenuity and enterprise in dealing with the economic and technical problems of gas production, transmission, distribution and utilization which are presented under the present extraordinary conditions. Its accomplishments have been attained under the difficulties imposed by the new restrictions on the procurement of materials, the ever-present mining hazard in natural-gas undertakings and the problems of advancing costs in all branches of the business as well as by the expenditure of time and money in complying with the routine requirements of increasingly complicated and voluminous regulatory procedure. The performance of the industry in dealing with its current problems, notwithstanding the difficulties and uncertainties now prevailing, is a further indication of the soundness of the economic principles which have been and are being followed in its development and of the value of maintaining the economic strength and progressive characteristics which are currently enabling the industry to make its important contributions to the national welfare under the present emergency conditions.

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Order Simplifies Procurement of Maintenance Equipment

(Continued from Page 64)

2. Unless the material to be delivered cannot be obtained when required without such rating;

3. By a supplier to obtain material in excess of the amount necessary to make rated deliveries.

(f) False statements and penalties.

Any person who applies the preference rating hereby assigned in willful violation of the terms and provisions of this order, or willfully falsifies records required to be kept or information to be furnished pursuant to this order, or who obtains a delivery of material by means of a material and willful misstatement will be prohibited from further applying said rating. Such person may also be prohibited from obtaining further deliveries of material under allocation and be deprived of any other priorities assistance. The director of priorities may also take any other action deemed appropriate, including the making of a recommendation for prosecution under Section 35A of the criminal code (18 U.S.C. 80).

(g) Revocation or modification.

This order may be revoked or amended by the director of priorities at any time in whole or in part or in its application to any producer or any supplier. In the event of revocation, or upon expiration of this order, deliveries already rated pursuant to this order shall be completed in accordance with said rating, unless the rating has been specifically revoked. No additional applications of this rating to any other deliveries shall thereafter be made by any producer or supplier affected by said revocation or expiration.

(h) Effective date.

This order shall take effect on the 9th day of September 1941, and unless sooner revoked shall expire on the 28th day of February 1942.

Penn-Grade Operators Continue Case Against Price Ceiling

By A. C. MacINTYRE

OIL CITY, Pa., Sept. 16.—Following a meeting of representatives of all sections of the Pennsylvania region here last week, the case against the price ceiling on Pennsylvania crude imposed by Leon Henderson, price administrator, was being whipped into shape in all parts of the section.

The task of assembling the data was being pushed to meet the provision of Henderson's office for a hearing—that the material must be submitted in advance of the meeting to permit the office to study it. Henderson's executive order, effective August 23, cut the then prevailing Pennsylvania crude price 23 to 25 cents.

The whole field was canvassed at the meeting here and all phases discussed. Considerable data have been prepared but further studies were held necessary. The work was definitely allocated and the material required from each section pointed out. The data will be presented at another meeting here or sent to the Washington office of the Pennsylvania Grade Crude Oil Association for correlation.

Those attending the meeting held in the office of the Pennsylvania Grade Crude Oil Association included:

E. W. Robinson, secretary of the West Virginia Oil and Gas Producers Association, Fairmont, W. Va.; H. W. Russell, Parkersburg, and Max Beren, Mountain Iron & Supply Co., Parkersburg.

W. K. Harrington, Henderson Oil Co., Marietta, Ohio; Philip N. Faine, secretary Ohio-Pennsylvania Oil Producers Association, New Straitsville, Ohio; D. T. Ring, Preston Oil Co., Columbus, Ohio.

C. C. Hogg, National Petroleum Co., Titusville, Pa.; Parke A. Dickey, Pennsylvania Topographic and Geological Survey, Pleasantville, Pa.

S. M. Vockel, Dun-Mar Oil Co., Pittsburgh; Alden W. Foster, Pittsburgh; W. F. Clinger, Warren; A. W. Clinger and George Clinger, Tidioute, Pa.

J. C. Martin, executive secretary of the Bradford Pennsylvania Oil Producers Association; C. E. Streeter, A. E. Booth and A. J. Saxe, all of Bradford; O. W. Walchli, Wellsville, and W. N. Davis, Olean, N. Y.

E. C. Breene, W. J. Brundred and Robert B Bossler, all of Brundred Oil Corp., Oil City; J. E. Moorhead and W. W. Dunlap, of the Pennsylvania Grade Crude Oil Association and F. B. Dow, general counsel and J. E. Keller, of the legal staff of the association, Washington, D. C.

All phases of the region's industry relating to prices are being studied and many charts, graphs, etc., being prepared.

●

Herbert Henderson Elected Gulf Oil Vice President

Herbert Henderson, general manager of the Gulf Oil Corp. engineering department, has been elected vice president in charge of engineering of both the Gulf Oil Corp. and the Gulf Refining Co.

Joining the Gulf companies in 1907, Mr. Henderson organized the company's engineering department at Port Arthur, Tex. During 1928, this department was transferred to Pittsburgh, Pa., and Mr. Henderson continued in charge.

Mr. Henderson's election to the Gulf vice presidency was announced following the regular meeting of the board of directors.

HERBERT HENDERSON

DEATHS

CHARLES H. ROBERTS, treasurer of Johns-Manville Corp., died September 10 at Doctors Hospital, New York, where he had been confined since August 20 for treatment of a heart ailment. Mr. Roberts was 51 years old and lived in Scarsdale, N. Y.

TOM C. JOHNSON, 56, oil operator of Wichita, Kans, died in that city September 12, following an illness of several months. Mr. Johnson was president of T. C. Johnson, Inc., which operated extensive oil properties in Kansas. He was a pioneer in Kansas proration, introducing the practice in the Valley Center field in 1929. He was a Kansas vice president of the American Petroleum Institute, and recently was named Kansas director of the Mid-Continent Oil and Gas Association. His widow and two daughters survive.

BASCOM H. ROGERS, 40, partner in the Rogers Oil & Gas Co., Oklahoma City, Okla., died September 12. He had lived in Holdenville, Okla., until 1919, when he moved to Oklahoma City. His widow, a son and two daughters survive.

JAMES THOMAS HILLIS, 80, former oil contractor and operator, died at Oil Springs, Colo.

JONKHEER HUGO LOUDON, chairman of the Royal Dutch Oil Co., died September 6 in the German-occupied Netherlands.

JAMES A. KNOWLES, 74, oil man of Kilgore, Tex., died September 12, after suffering a heart attack in his sleep. Mr. Knowles retired from active management of his large oil holdings shortly after the East Texas discovery in 1930. He became widely known as a philanthropist. Mr. Knowles was born near Tyler, Tex., in 1867, and moved to Kilgore in his early youth. A daughter and a foster daughter survive.

ALVIN A. LASHER, 76, Tulsa, retired oil man, died September 10. He was born in Pennsylvania and worked in the oil fields of that state before coming to the Mid-Continent in 1919. From 1926 until his retirement a few years ago, Mr. Lasher was employed by Magnolia Petroleum Co. at Mirando City and other South Texas operating points. The widow, two daughters and a son survive.

JAMES D. WARD, 60, a driller who lived at Amarillo, Tex., died September 12 at Fort Sumner, N. M. The widow, three daughters and two sons survive.

WILLIAM N. DOWNER, land department employe of Gulf Refining Co. for 25 years, died September 13 at his home in Shreveport, La. Death followed a heart attack. His widow and a son survive.

L. J. LYNCH, 47, independent oil operator of Vernon, Tex., died September 13, at a Vernon hospital, following a long illness. His widow survives.

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Kewanee Purchases 30 Wells From Cockburn in Maljamar

Kewanee Oil & Gas Co., Tulsa, has purchased 30 producing oil wells in the Maljamar field of Lea and Eddy counties, New Mexico, from Barney Cockburn, Burkburnett, Tex., for a consideration of $1,500,000. The purchasing company is headed by William M. Potts of Philadelphia, Pa., president; F. B. Holwand, Titusville, Pa., general manager, and J. B. Steele, Tulsa, superintendent.

The 30 producing wells are in Sections 27 and 28, Township 17s, Range 32e. Two locations remain to be drilled on the 1,280 acres involved in the transaction.

THE MARKETS*

CRUDE OIL: Posted prices in all fields of the country are firm and a few scattered advances continue. The price of Cotton Valley (Louisiana) distillate was advanced 10 cents to a flat price of $1.40 per barrel, retroactive to September 1. Premiums are reported in a few areas where conditions of transportation or special quality are factors in the market.

REFINERY PRODUCTS: Prices are trending higher in all sections, particularly in the territory east of the Rocky Mountains. Some of the advances are a direct result of higher transportation costs which are beginning to play an increasingly important part in product markets. Fuel oil and wax moved higher in the East Coast territory. Gulf Coast markets for gasoline are stronger. Several cargoes of motor fuel and burning oils were sold last week eliminating all material that had been pressing for an outlet.

TANK WAGON AND POSTED DEALER: Texas marketers raised tank-wagon and consumer prices 0.5 to 1 cent per gallon during the last half of the past week. The higher market is receiving general support. A soft spot developed during the week at Wichita, Kans. Elsewhere the markets were steady at unchanged levels.

FINANCIAL: Oil securities moved slightly higher. Averages of 30 representative stocks for the week ended September 13: High, 26.59; low, 25.79; close, 26.39. For week ended September 6: High, 26.51; low, 25.76; close, 25.94.

*Detailed information in Market Section.

"Loss" pays a profit

Refiners used to call it "gas loss" but now it pays a profit—that's the gas produced in cracking operations

They used to pipe it right from the cracking unit to a still or boiler furnace

It was mighty expensive fuel but refiners didn't know that till Universal brought out the catalytic poly process They know it now—it's being proved all over the world

Today, wise refiners run their cracked gas through a U. O. P. catalytic poly unit and get several gallons of 81-83 octane polymer gasoline from each 1000 cubic feet And they have about 70 per cent of the gas—stripped but still high in B.t.u. value—left for fuel

How much is 81-83 octane gasoline worth to you?

We'll be glad to tell you how much you can make from your cracked gas—by U. O. P. catalytic polymerization

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

International

Colombia . .

Exports of Crude Oil Fall 20 Per Cent Behind 1940

EXPORTS of crude petroleum from Colombia declined 20 per cent in the first half of this year from the corresponding period of 1940. Oil shipments totaled 9,670,000 bbl. in the first 6 months of 1941 against 12,097,000 bbl. in the like 1940 period. Only in May were monthly exports this year higher than they were last year.

Comparative data on Colombia's crude exports for the first 6 months of 1940 and 1941 follow:

Month—	1940	1941
January	1,790,000	1,381,000
February	2,197,000	1,485,000
March	1,557,000	1,418,000
April	2,610,000	1,536,000
May	1,912,000	2,317,000
June	2,031,000	1,533,000
Total	12,097,000	9,670,000

Japan . .

Acute Oil Shortage Seen In Gasoline-Curb Order

RESTRICTIONS imposed on delivery of petroleum to Japan resulted recently in suspension of gasoline distribution for taxicabs, buses and private automobiles. All vehicles of the types mentioned must be operated with substitute fuels or retired from service, except by special government permission.

Gasoline had been strictly rationed since start of the Chinese invasion but a limited amount of civilian and commercial operation of motor vehicles had been possible until the more drastic order was issued.

Normally, Japan consumes 38,000,000 to 40,000,000 bbl. of petroleum and in years preceding the Chinese conflict the United States supplied more than 30,000,000 bbl. of the total. Cessation of petroleum exports, except by special license, ordered by the U. S. Government a few months ago, has seriously restricted Japanese oil economy. Before war with China started in 1937, Japan had required all oil companies in that country to carry inventories equal to 6 months' supply. This regulation would indicate that Japanese companies had approximately 20,000,000 bbl. of petroleum in inventory at the outbreak of the war. The Japanese Government had long nursed a policy of building petroleum stocks but the quantity held under this classification is unknown.

Japan has approximately 50 petroleum refineries widely scattered throughout the country. Most are small plants in comparison with American standards but in the aggregate they represent capacity to refine about 52,500 bbl. daily.

The productive concession in northern Sakhalin provides Japan with about 1,650,000 bbl. of crude annually and a 7-year plan, instituted in 1940, projected expansion of operations there on a goal of 3,260,000 bbl. of production in 1942. The plan provided for increased operations in other productive parts of the Japanese Empire. The indigenous production of crude oil in 1942 was planned at 5,132,000 bbl.

The Japanese agreement with the Netherlands East Indies provided for delivery 14,000,000 bbl. of petroleum annually, including 5,900,000 bbl. of crude. The agreement was reached in November 1940. Since that time, political differences between Japan and the Netherlands governments have been widened and it is not disclosed in official information whether service continues on the petroleum agreement of last November.

The recent order prohibiting distribution of gasoline to all private and commercial vehicles indicates that Japan needs most of its available petroleum for its military operations. Based on 1938 data, estimates are that Japanese military consumption of petroleum aggregates about 11,500,000 to 12,000,000 bbl. annually, or about 30 per cent of the normal total.

Australia . .

Substitute-Fuel Program Provides Sixth of Needs

WITHIN 4 months Australia expects to be in a position whereby she can satisfy one-sixth of her motor-fuel requirements from substitute fuels, George McLeay, supply minister, has announced. A total of 45,000,000 gal. is expected to be obtained from the following sources:

12,000,000 gal. from shale oil;
12,000,000 gal. power alcohol from wheat;
7,000,000 gal. from sugar, molasses;
5,000,000 gal. from rectified spirit;
2,000,000 gal. from methane gas;
7,000,000 gal. from benzol.

Minister McLeay has also adopted a four-point plan for dealing with Australia's motor-fuel supply problem in 1942:

1. Increase and maintain secret reserves;
2. Spread imports equally by months over 1942;
3. Coordinate, by negotiations now under way, the civilian gasoline consumption of Australia with that of New Zealand and South Africa, with uniformity in ration systems in the three dominions, and rationalized tanker transportation to secure a continuous and regular supply;
4. Ask Anglo-American tanker committee to fix immediately the quota of tankers it can allot to Australia in 1942 subject to the war situation.

As another step in the gasoline-control policy, the geological adviser will begin an oil-from-shale search in promising areas in South Australia.

Brazil . .

Naphtha and Diesel-Oil Demand Shows Decline

ESTIMATED June consumption of light diesel oil decreased somewhat to 846,539 gal. from 908,971 in the preceding month. Consumption of naphthas — 14,409,786 gal. — also showed a drop from May's 15,968,316. On the other hand, June kerosene consumption rose to 2,867,928 gal., from 2,445,299 in May.

Manchuria . .

Lubricating-Oil Plant to Start Operations in 1942

THE South Manchuria Railway Co. will erect a plant in Mukden during the next 2 years for the manufacture of cylinder oil, according to a recent report. The raw material to be used is not stated, but company officials declare that the new plant will start operation in 1942 and that it will make Manchukuo self-sufficient in cylinder oil.

An unconfirmed rumor was received in this country several months ago that oil had been discovered in Manchukuo. However, it is held more probable that the lubricating-oil manufacturing plan envisages use of shale oil which is produced there in limited quantities.

Mexico . .

Petroleum Exports Drop 32 Per Cent in 6 Months

MEXICO'S exports of petroleum dropped to the lowest point of the year in June when they totaled only 1,046,000 bbl. This total compared with 1,073,000 bbl. in May and with 2,586,000 bbl. in June 1940, the best month since the European war started.

For the entire first half of this year Mexico's exports aggregated 6,965,000 bbl. in contrast to 10,255,000 bbl. in the first 6 months of 1940. This was a decline of 3,290,000 bbl. or 32 per cent. In each month of this year Mexico's oil exports have been running behind those of last year as the following table shows:

Month—	1940	1941
January	1,468,000	1,088,000
February	1,302,000	1,074,000
March	1,711,000	1,331,000
April	1,532,000	1,353,000
May	1,656,000	1,073,000
June	2,586,000	1,046,000
Total	10,255,000	6,965,000

All the loss was incurred in crude-oil exports since shipments of refined products increased. Crude-oil exports in the first half of this year totaled 3,939,000 bbl. against 7,545,000 bbl. last year, a decline of 3,606,000 bbl. or 47.8 per cent. On the other hand, refined-oil exports in the first half of 1941 were 3,026,000 bbl. against 2,710,000 bbl. a year ago, an increase of 316,000 bbl. or 11.6 per cent.

A breakdown of Mexico's petroleum exports by products is given in the following table comparing the first 6 months of 1941 with the corresponding period of 1940:

Product—	First 6 months 1940	First 6 months 1941
Crude oil:		
Light	6,223,000	3,498,000
Heavy	1,322,000	441,000
Gasoline	127,000	422,000
Kerosene	69,000	41,000
Gas oil	1,248,000	995,000
Fuel oil	1,004,000	1,456,000
Asphalt	262,000	112,000
Total	10,255,000	6,965,000

First trainload of 21 tank cars carrying 5,000 bbl. of Illinois crude oil arrives at the railroad yards of the Atlantic Refining Co. in Philadelphia, Pa. New source augments the company's crude-oil supplies which have been restricted because of the diversion of a fleet of oil tank ships to British service

Refinery Expansion

Atlantic's Point Breeze Refinery Receiving 10,000 Bbl. of Illinois Crude Daily by Rail

RAIL movement of petroleum from the interior to the East Coast was increased last week by arrival of the first 21 cars loaded with 5,000 bbl. of crude at Atlantic Refining Co.'s Point Breeze refinery near Philadelphia, Pa. The shipment originated at Benton, Ill., and establishes the start of an auxiliary supply of crude oil that will, according to present plans, increase to a volume of 10,000 bbl. daily before the month ends.

Atlantic's movement from Illinois is to augment the company's crude deliveries on the East Coast which have been restricted during recent months by the diversion of tankers from runs between the Gulf Coast and Philadelphia. Atlantic has given up the equivalent of 47,500 tons of tankers in the diversion to British service.

The projected delivery of 10,000 bbl. daily will require between 500 and 600 tank cars which, depending on conditions of railroad service, should make 2 to 2½ round trips a month between Illinois and Philadelphia.

The first consignment was unloaded at Point Breeze at a new rack which had been made ready for this purpose during the last few weeks to handle the shipments. The rack accommodates two trainloads of 25 cars each. It is equipped with a collecting system and pumps to lift the incoming crude into storage tanks to await refining.

In the report to Oil Coordinator Ickes 2 weeks ago Robert H. Colley, Atlantic president, said the company also was saving 10,460 bbl. of tanker space by increasing the efficiency of its transportation system. He reported a saving of 5,000 bbl. capacity resulted from the use of a new $1,500,000 marine terminal at Fort Mifflin, Pa., where tankers will be unloaded, obviating the necessity for tankers to navigate the Schuykill River to the Point Breeze plant. The average tanker carries 70,000 bbl., requires 17 days for a round trip between the Gulf Coast and Philadelphia, and thus handles 4,000 bbl. a day.

An additional saving of 4,150 bbl. a day tanker capacity has resulted from the observance of the modified load-line regulations, which permit tankers to take on greater cargoes than were permitted prior to the emergency. Other savings are to be accomplished by arranging to utilize another company's oil pipe line for gasoline shipments to Newark, N. J., and by exchanges of gasoline, furnace oil, and kerosene with other companies. Similar exchanges, in which Atlantic is participating, Mr. Colley said, were enabling other companies to save tanker space amounting to 6,300 bbl. a day.

Mr. Colley also reported that the company had just put in service a new tanker, providing an additional 10,000 bbl. a day tanker capacity. A similar ship will be added next December, he said.

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Nondefense Refinery Jobs Clouded by SPAB Order

Refinery construction and expansion projects which cannot qualify as essential to defense apparently are covered in an order issued last week by the Supply Priorities and Allocations Board "freezing" all new work in this category. Projects now under construction are reasonably certain of delivery on materials needed to complete the jobs regardless of their defense standing.

The order bringing a full stop on all civilian expansion work that requires materials essential to the defense program apparently is an emergency measure applied pending completion of a survey of all needs. SPAB ordered its executive director, Donald M. Nelson, to work out a complete schedule of the nation's military and civilian requirements. The board announced the survey plans, which it termed a detailed planning of the defense program, after halting expansion of all civilian industries which would require large quantities of defense materials.

Materials needed by the petroleum refining branch of the industry for repair and maintenance work are covered in the OPM order of September 9 extending a priorities number of A-10 to such requirements. Refinery projects for the manufacture of essential defense materials such as toluene, synthetic rubber and 100-octane gasoline have been receiving high preference rating on special application to the Priorities Division of OPM. New construction of refinery facilities for production of civilian commodities, however, apparently is blocked until a more complete study of the materials supply position can be assembled.

Significance of the new SPAB policy regarding the petroleum refining industry has not been subjected to any important test. Refiners, however, are showing concern because of the need for simple distillation and cracking equipment in order to provide the refinery gases from which aviation gasoline is produced.

Refinery runs have been hovering around the average of 4,000,000 bbl. daily, leaving only about 535,000 bbl daily of operating capacity in reserve. Total crude capacity of the country's refineries is 4,826,715 bbl. daily but 291,940 bbl. of this total is contained in shutdown plants. Need for construction of additional refining capacity may develop with surprising speed if the consumption by defense industries and the military services continues to expand at the present rate.

Aviation-Fuel Unit Planned By Premier in Louisiana

Construction of an aviation-gasoline plant in the Cotton Valley field, Webster Parish, Louisiana, is proposed by Premier Oil & Refining Co., Longview, Tex., in a program now under consideration by the War Department.

Cost of the proposed plant is estimated at $1,730,000. Plans involve a deviation from processes in most general use for production of aviation motor fuel; it is said to be similar to one now being used in England, but company officials refuse to comment on the details.

Sylvester Dayson, president and general manager, declined to reveal the proposed daily capacity of the plant. J. R. Parten, chairman of the company and president of Woodley Petroleum Co., Houston, Tex., was in Washington, D. C., discussing the proposal with officials of the War Department.

Two Centralia Refineries Arrange to Use Gas Fuel

Advance Refining Co. and Arrow Petroleum Co., formerly Egyptian Producing & Refining Co., Centralia, Ill., soon will install gas-burning equipment in their refinery furnaces.

The Arrow Petroleum Co. refinery, recently purchased from the Egyptian company, was to have resumed operations September 16 after a shutdown period. The Arrow plant has daily capacity of 2,000 bbl. and the Advance is equipped to handle 2,750 bbl. daily.

Natural Gas

Manufacturers Light Asks Higher Gas Rates

Nine volumes of research information and a detailed map of producing, transmission and distributing facilities last week were placed before the Pennsylvania Utility Commission in support of an appeal for higher natural-gas rates by Manufacturers Light & Heat Co. Higher rates in eight western Pennsylvania counties are requested by the company.

E. J. Egan, vice president and operations manager of the company, explained conditions prevailing in the 1,290 wells in Ohio, Pennsylvania, and West Virginia which, the gas concern contends, make higher rates imperative.

PROGRAMS AND MEETINGS

Stimulating Program Arranged For Fall A.I.M.E. Meeting

With Dr. John F. Dodge, consulting petroleum engineer and geologist with the California State Railroad Commission as chairman, the fall meeting of the Petroleum Division of the American Institute of Mining and Metallurgical Engineers, October 29-30, will present a forum session with the subject, "Is Unified Pressure Control Essential to Oil Recovery—the Paloma Plan?" Prior to the open forum, at which time all present will be invited to participate, the following group of papers will be presented:

1. "Geology and Development," by J. T. Woods.
2. "P.V.T. Relations," by Norris Johnston.
3. "A Plan for Operation," by William H. Geis.
4. "The Management's Viewpoint," by Paul Huggins.
5. "The Gas Company's Viewpoint," by William Moeller, Jr.
6. "The Landowner's Viewpoint," by Paul Paine.

Other papers to be presented include a talk by Eugene A. Stephenson on "Sound Petroleum Engineering Technology." In addition to being professor of petroleum engineering at the University of Kansas, Mr. Stephenson is a member of the engineering committee of the Interstate Oil Compact Commission and is well qualified to discuss this subject. Harold W. Hoots, formerly with the U. S. Geological Survey and now chief geologist of Richfield Oil Corp., will open the meeting with a paper entitled, "A Geologic Setting for the Occurrence of Oil in California Fields."

Other papers will include "How the Small Operator Can Use Good Engineering Practice," by Ernest N. Merrill, formerly associated with the Shell Oil Co. in the production engineering department, and now engaged as an operator in the San Joaquin Valley. Ray L. Riley, commissioner of the State of California Railroad Commission, will talk on "A Program of Utilization of Natural Gas—California"; W. J. Travers, Jr., will present "Completion and Recompletion Practices Related to Well Productivity," and F. R. Schmieder will discuss "Opportunities in Petroleum Engineering From the Manager's Viewpoint."

On the evening of October 29, John Suman, president of the institute, will informally address the stag banquet to be held at the Ambassador.

N.G.A.A. to Hold Annual Meeting in Tulsa May 13-15

The annual convention of the Natural Gasoline Association of America will be held May 13-15, 1942, in the Mayo Hotel, Tulsa, according to William F. Lowe, secretary-treasurer of the association. These dates are the 3 days preceding the opening of the International Petroleum Exposition and will permit interested oil men to take in both attractions with one trip to Tulsa.

A full program is already being planned with special features of interest since this meeting will mark the twenty-first anniversary of the N.G.A.A.

Purchasing Agents Begin Fall And Winter Meetings

The Purchasing Agents Association of Tulsa will resume its fall and winter schedule of regular meetings with an open meeting Tuesday night, September 23, at the Chamber of Commerce Building. The speaker will be Walter Geist, vice president, Allis-Chalmers Manufacturing Co., Milwaukee, Wis., and his subject will have to do with the national-defense program.

Mr. Geist has an important background throughout the country as an authority on production problems. He invented the multiple V-belt drive in 1925, and has other accomplishments to his credit. The meeting will be preceded by a dinner.

High Pressure Gas Division Is Added to N.G.A.A.

A High Pressure Gas Division of the Natural Gasoline Association of America was created at a recent meeting of the board of directors of that organization, and E. E. De Back, general manager of the Chicago Corp. of Corpus Christi, Tex., was named vice president. The action of the directors was announced in Tulsa last week by Ray E. Miller, Tulsa, president.

The new division is designed to replace the American Recycling Association of which Mr. De Back was president. Other officers of the recycling association were Dr. O. L. Roberts, Atlantic Refining Co., vice president, and Prof. R. L. Peurifoy, Texas College of Arts and Industries, secretary-treasurer.

The High Pressure Gas Division will function as an integral part of the N.G.A.A. with offices in Tulsa, but most of its meetings will be in cities centrally located in the distillate-producing areas of Texas and Louisiana. It will have two working groups, a testing and sampling committee and a gas measurement committee, and other committees to be formed as needed, Mr. Miller said.

Oil Workers Invited to Banquet

All men employed with oil production, or engaged in work connected with the industry, such as refineries, gasoline plants, supply firms, etc., in the Electra, Tex., area, are to be invited to attend the fourth annual oil men's feed, to be staged by the Electra Chamber of Commerce, Friday evening, September 26, at the Electra Country Club. Mayor T. Leo Moore, an independent producer and drilling contractor, who is chairman of the oil bureau of the Chamber of Commerce, is general chairman of the banquet.

CALENDAR OF EVENTS

September

NATIONAL PETROLEUM ASSOCIATION, thirty-ninth annual meeting, Hotel Traymore, Atlantic City, N. J., September 17-19.

SOCIETY OF AUTOMOTIVE ENGINEERS, national tractor meeting, Schroeder Hotel, Milwaukee, Wis., September 25-26.

NATIONAL LUBRICATING GREASE INSTITUTE, ninth annual meeting, Stevens Hotel, Chicago, September 29-30.

October

WEST VIRGINIA OIL AND NATURAL GAS ASSOCIATION, annual convention, Clarksburg, W. Va., October 2-3.

WESTERN PETROLEUM REFINERS ASSOCIATION, regional technical meeting, Allis Hotel, Wichita, Kans., October 3.

NATIONAL FOREIGN TRADE CONVENTION, twenty-eighth meeting, Hotel Pennsylvania, New York City, October 6-8.

NATIONAL SAFETY CONGRESS, Stevens Hotel, Chicago, October 6-9.

TEXAS MID-CONTINENT OIL AND GAS ASSOCIATION, twenty-second annual convention, Beaumont, Tex., October 9-11.

INDIANA INDEPENDENT PETROLEUM ASSOCIATION, fall convention and old-timers' gathering, Hotel Severin, Indianapolis, Ind., October 14-15.

AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, Pacific section, Los Angeles, Calif., October 16-17.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, Dallas, Tex., October 16-18.

WESTERN PETROLEUM REFINERS ASSOCIATION, regional technical meeting, Washington-Youree Hotel, Shreveport, La., October 17.

NATIONAL STRIPPER WELL ASSOCIATION, Tulsa, October 20.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, twelfth annual meeting, Tulsa, October 20-21-22.

SOCIETY OF AUTOMOTIVE ENGINEERS, national fuels and lubricants meeting, Mayo Hotel, Tulsa, October 23-24.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Southern California section, Los Angeles, Calif., October 29-30.

SOCIETY OF AUTOMOTIVE ENGINEERS, national aircraft production meeting, Biltmore Hotel, Los Angeles, Calif., October 30-November 1.

CALIFORNIA NATURAL GASOLINE ASSOCIATION, Los Angeles, Calif., October 31.

November

AMERICAN PETROLEUM INSTITUTE, twenty-second annual meeting, St. Francis and Palace Hotels, San Francisco, Calif., November 3-7.

SOCIETY OF AUTOMOTIVE ENGINEERS, West Coast transportation and maintenance meeting, San Francisco, Calif., November 5-6.

SOCIETY OF AUTOMOTIVE ENGINEERS, natiinal transportation and maintenance meeting, Statler Hotel, Cleveland, Ohio, November 13-14.

December

EXPOSITION OF CHEMICAL INDUSTRIES, eighth annual meeting, Grand Central Palace, New York, December 1-6.

NEW MEXICO OIL AND GAS ASSOCIATION, Artesia, N. M., December 3.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, Southeastern district meeting, New Orleans, La., December 3-5.

OKLAHOMA STRIPPER WELL ASSOCIATION, Tulsa, December 5.

PIPE LINE

SECTION

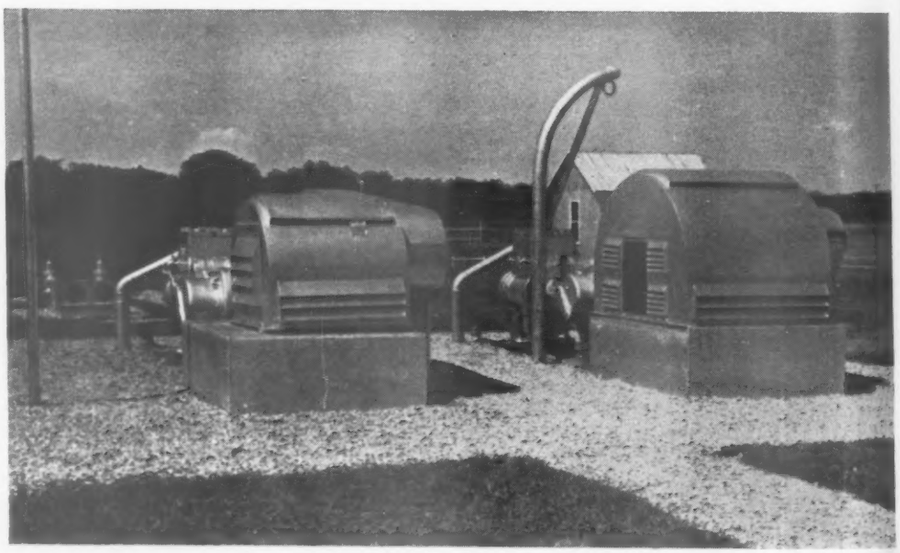
Preparing to coat pipe for Lost Creek Crossing, Morgan County, Utah

Recent progress and new engineering developments indicate that the pipe-line industry is going forward to future practices which will have a profound effect on all phases of petroleum transportation. These practices include new construction procedures as well as

Future Trends in Pipe-Line

RECENT progress, new methods not yet generally applied in practices of the industry and evidence of new ideas renew and justify faith in the future technical development of the pipeline industry, provided the incentives are not destroyed. Fifteen years ago, this industry, somewhat staid, encumbered by traditional methods and more or less obsolete facilities, was marking time under the uncertainty of petroleum reserves being adequate to support investments over a long period of time. Then, unexpectedly, it cast off a complacent attitude, courageously undertook a solution of its problems, and renewed its confidence in the future of the industry. Since then, progress has been made in each successive year. It has grown stronger and more efficient. At the same time, it has become a more valuable asset in the national economy; in this respect its value is more fully realized in this period of national emergency. Today it is a virile and an aggressive industry.

New methods and materials developed by or for the industry, although beneficial in their long-range effects, at the beginning placed on all pipe-line companies, especially the older ones, a heavy burden of obsolescence. Adapting and modernizing old systems to the new developments then became and still are problems of first importance. Presumably, all companies are fully informed of the trend. Some are doing everything consistently possible to modernize their facilities and keep pace with progress. Some may be hoping that the obsolete facilities will serve indefinitely even under more competitive influences. But improvements and better methods representing progress cannot be delayed, thwarted, or frustrated by failing to recognize and meet changing conditions. Fundamentally, evolutionary progress in industry cannot be impeded by disregarding and defying it. Inevitably, progress and the laws of economics will have their way; the consequences of disregarding either is usually extinction. This language may be somewhat abstract; but it means simply that the cycle of progress, starting about 15 years ago, is still under way and that the surviving companies will be those which can and will adapt their facilities to new conditions, accept improved methods, and plan for more efficient operations. From the economic viewpoint, permissible costs in the future cannot be based on the revenue of the past. Under the in-



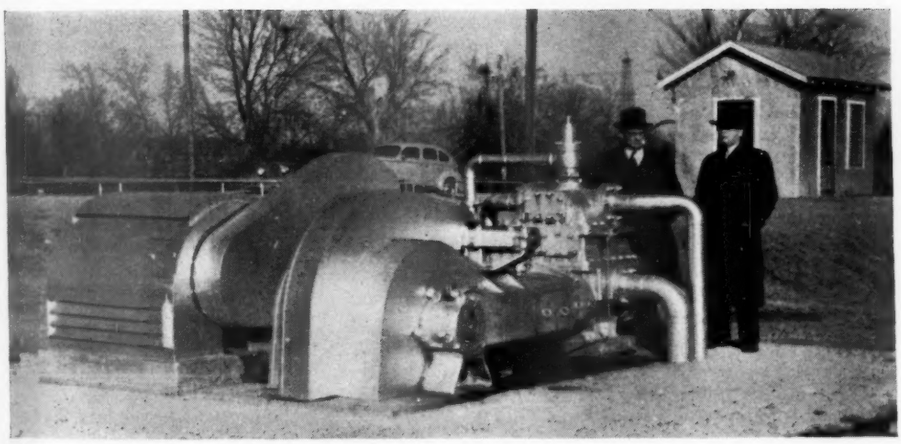
Above: Outdoor automatic gathering station, Alluwe, Okla. Below: Pump for evacuating lines and scraper trap. Meter setting with calibrating tank at terminus of line at a refinery

steps to be taken in modernizing old systems to conform with new methods. Of great significance is the adoption of higher pressures providing flexibility which makes possible more economical operation. Today's emergency conditions require unusual solutions.

Crude-oil trunk-line pumping station

Practices

By WILLIAM G. HELTZEL



Above: Fitts Station. Suction pump unprotected in yard. Below: Combination coating and wrapping machine operating on large-diameter pipe

fluence of improved methods and materials, as well as the urge of the public for lower prices, the trend of rates and revenues for the transportation of petroleum products has been and still is definitely downward. The logical consequence will be modernization of old facilities, more efficient designs and lower operating costs in the future, which in turn contribute to a greater economy and the advancement of social progress.

Looking to the Future

Pipe lines of the future will be fundamentally different from the present systems. Higher operating pressures—1,000 to 2,000 lb.—can be anticipated; 1,000-lb. pressure will be normal. Pumping stations will be spaced at greater distances. For trunk-line service, the diameters of pipe will be increased. Reserve pumping capacity will be obtained by higher pressures, provision being made in the pumping machinery for horsepower and speed, rather than by spare-line capacity at pressures customarily used by the industry today. For this reason, less storage along trunk lines will be required to meet dispatching schedules. Trunk-line systems will operate from the beginning to the end as "closed systems" with the pumping stations synchronized with each other.

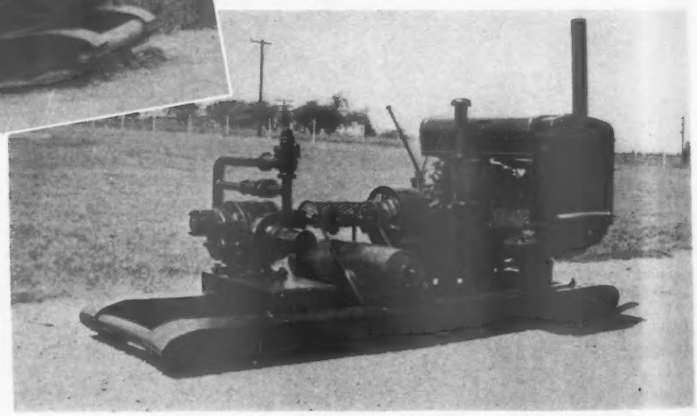
Except for the dimensions, no important changes can be anticipated in the physical qualities of pipe. Further improvements in methods of construction can be anticipated. Pumping stations will be simpler and more compact. Higher speeds will be used for engines and pumps, the latter being of rugged construction for high operating pressures. Discharge and manifold piping systems will be designed to carry on high-pressure operations safely. Centrifugal pumps good for 1,200-lb. operation and portable piston-type pumping equipment to be operated up to 800 lb. will be used more extensively for field-gathering stations and temporary installations. Thinner-wall pipe will come into more extensive use for field gathering systems.

More and more tractors on the farm, millions of automobiles, buses and trucks on the highway, an increasing number of domestic oil-burner installations each year, the growing use of airplanes for travel, express and freight, the demand of the urban population for natural gas, and now the use of the diesel locomotive for all classes of railway service, all together signify an accelerated trend to liquid and gaseous fuels, which in turn should mean a sustained prosperity for the crude-oil pipe-line systems and a continued growth of natural-gas and refined-products pipe-line systems.

An interesting development also is the manufacture of synthetic commodities from re-

(Continued from Page 151)

Gathering-System For Illinois Lines



Left, top: Shaft from power takeoff of truck operates threading machine. Center, left: Portable belt-driven pump unit mounted on steel base built for requirements of transportation in the field

Right: Rotary pump direct-connected to gas engine with flexible coupling, protected by guard of type which provides for convenient inspection without removing guard

By J. W. MEEHAN
Superintendent, Pure Oil Co.

DURING the past several years, all industries and their interrelated units have been undergoing changes relative to operating practices. Pipe lines are keeping step with the modern developments that are taking place and are adopting up-to-date methods in the operation of their lines and equipment. Of course, most of these changes were developed with the thought in mind of increasing efficiency or reducing the cost of particular operations. Such changes have been worked out jointly between transportation and manufacturing company engineers who have worked very closely on such ideas in designing equipment for experimental purposes. The principal changeover occurring in pipe-line operations has been an attempt to use as much portable equipment as is possible, and yet maintain a high standard of efficiency in operations.

Portable Equipment

When the word portable is mentioned, the idea is immediately conveyed that it has reference to something which is easily moved or transported. In our particular phase of the industry, the word should not only indicate that it can be easily transported, but that the actual installation of such equipment can be almost as simple as the movement. This, of course, has reference primarily to pumping equipment, booster stations, etc., and really should include operating equipment such as ditching machines, light plants, welding equipment, backfillers, and such other tools as are used in pipe-line construction and maintenance.

When portable equipment is used, there are several steps necessary which must be worked out prior to the actual operations. The first steps are analyzed in the engineer's office of the pipe-line company. It has been definitely determined that a line must be laid to take care of production and, immediately the project is laid out, to determine the size of pipe best suited for the job and to what distances the oil will have to be moved to reach a central terminal. Pumping units are very important items for it is first determined what pressures will be involved in the moving of such oil and whether or not a power pump is required against either a rotary or centrifugal. In planning such operation it is always desirable to move the greatest amount of oil in the minimum amount of time so the pressures are held to a minimum wherever possible. Power pumps are standard equipment with most of the pipe-line companies, ranging in size from a 6-in. to a 12-in. stroke with various sized pistons depending on the size of the system operating. This pumping equipment is driven in the Illinois area mostly by internal-combustion engines ranging in horsepower from 25 up to 80. This again is dependent upon the volume of the oil to be moved and pressures against which the system is operating.

Develop Compact Unit

Operations in this area have brought about the development of a small, compact unit consisting of a centrifugal pump driven by a one-cylinder engine ranging in horsepower from 2½ to 7 for the sole use of delivering oil from a tank battery to a centrally located pumping unit. These portable centrifugal units have been developed to a point where two men can easily install them and are capable of handling from 150 to 180 bbl. per hour against the suction side of a main-line unit. Such installation assures maximum operation by delivering a steady stream to the central unit, thereby guaranteeing constant loads and more efficient operation at all times. These small units are installed as close to tank batteries as is possible and pumping time is reduced, for with a gravity system, unless elevations are satisfactory, there is a loss of pumping efficiency when the oil levels in tank batteries fail to keep the pumps filled.

Importance of Ditching Machines

Ditching machines play an important part since in the gathering operation it is always desirable to have lines buried as soon as possible in order to reduce sun pressure and also prevent heavy machinery being pulled across exposed lines, especially in the development in new areas. With this thought in mind, a ditching machine should be

Practices Specially Developed

selected which can be loaded on a trailer, unloaded, and ready for operation within a very short period following its arrival at the construction point. These machines can be hauled very economically and can be used to cut road crossings instead of using hand digging. Ditching machines of such design are capable of ditching ¾ mile of pipe line per day, especially in gathering areas where lines are buried usually not beyond 24 in. in depth.

Maintenance Department Car

Another important phase of gathering-line operation is the maintenance of mechanical departments, whose duties are to service portable pumping units in an area where a goodly number of such units are in operation and, of course, many minor repairs can be made in the field without bringing the unit back to the base shop. Mechanical failures have no respect for time and they may occur at any time during the 24 hours of the day. With this in mind, there was developed a maintenance department service car which carries one complete set of parts for all portable field pumping units to make emergency repairs. This pickup also has available for its use a portable light plant equipped with electrical outlets for driving small hand tools with a.c. current up to 110 volts. Welding equipment, likewise, is of a portable nature so that this department can take such equipment along when necessary, either an electric welding machine or acetylene equipment, to perform whatever repairs are necessary in order that units may be returned to service as quickly as possible and avoid long shutdowns.

Cutting-In Machine

Another important development, which was probably borrowed from the gas industry, is the use of a cutting-in machine. This is nothing more or less than a cutting tool which can pass through a full-opening gate valve and cut into the line while operating at full pressure. The use of such tools eliminates shutdowns as well as the loss of oil, and saves a considerable amount of money in damages when necessary to cut a feeder line into a main gathering line.

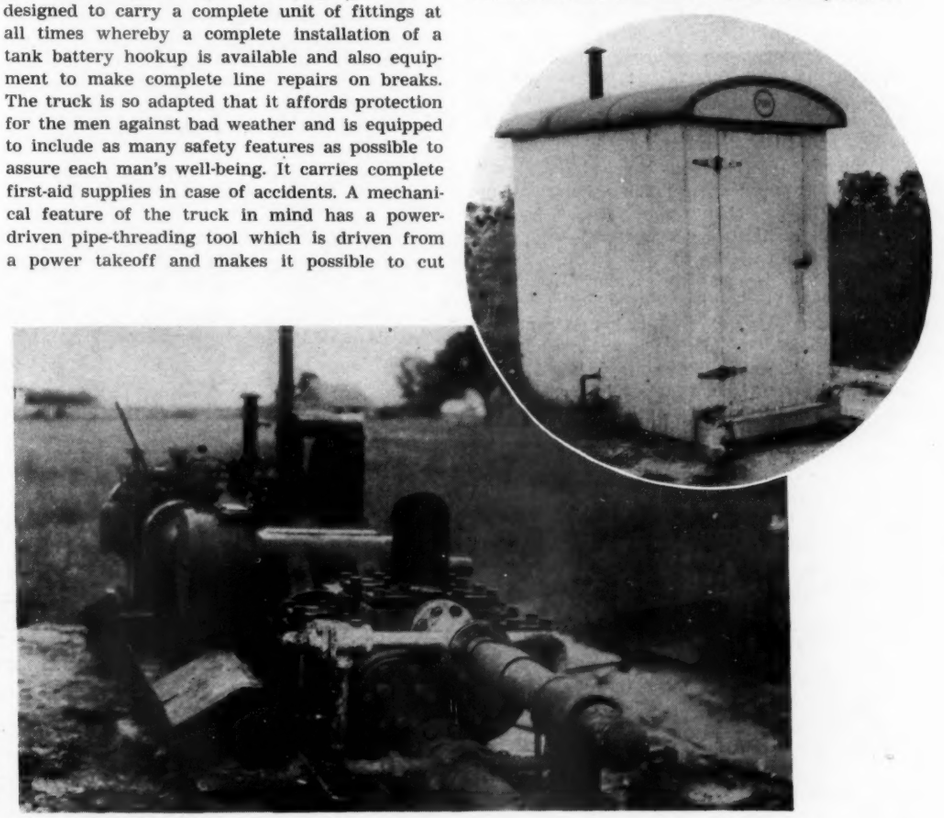
In the past whenever a pump house or small tool shed was erected, it was always constructed more or less on a permanent basis. In the past few years, these have been fabricated by the manufacturers of steel to such size that they can be hauled directly to the job and set up for immediate use and then moved on to another location when no longer needed. Pump buildings, when constructed of a portable design, can be placed together in sections on which additions can be made as more equipment is needed at the station, or the size can be reduced as equipment is released.

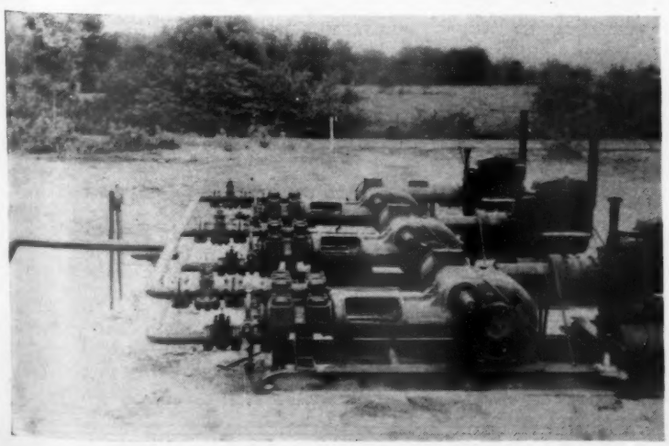
A very important piece of equipment in any pipe-line division is what is referred to as a gang truck. While this gang truck is probably as old as the industry, it has been streamlined to the point where it is used not only as a transport truck for men and tools, but is practically a complete workshop. The present-day gang truck is designed to carry a complete unit of fittings at all times whereby a complete installation of a tank battery hookup is available and also equipment to make complete line repairs on breaks. The truck is so adapted that it affords protection for the men against bad weather and is equipped to include as many safety features as possible to assure each man's well-being. It carries complete first-aid supplies in case of accidents. A mechanical feature of the truck in mind has a power-driven pipe-threading tool which is driven from a power takeoff and makes it possible to cut threads on pipe in about one-third the time required by hand threading. While this idea is not entirely new it has been developed to a point whereby all threads are cut on the job instead of in the shop by machine or in the field by hand, so as to assure rapid progress on construction as well as accurate dimensions while the work is proceeding.

Must Develop Ideas

The aforementioned changes, although a good many of them have been borrowed from ideas seen in various projects and only a small number of them are in actual operation on all lines in the United States today, tend to bring forth the idea that pipe lines are becoming streamlined just as are other methods of transportation. It is obvious that the effect of present world conditions will be felt by all pipe-line companies as an aid in developing and perfecting new types of equipment whereby substitutes will be developed for present pieces of equipment which may be difficult to obtain. It is already evident that replacements may be hard to secure, which leads us to believe that the maintenance department will be kept busy in developing ideas in order to insure maximum and efficient operation, and eliminate downtime as much as possible. It is very apparent that in visiting the various oil fields, the present trend, which by no means has been fully developed, is the adoption of light portable equipment that will guarantee economical and continuous operation.

Portable tool shed with skids to aid in loading on truck





Above: Individual portable pump unit with tool box welded to base to provide for having tools where they can be readily procured when needed

Left: Battery of portable gas-engine-driven pump units on timber foundations. Manifold piping was fabricated in shop

Field Tests of Pipe Materials And Pipe Coatings in Soil

By KIRK H. LOGAN
U. S. Bureau of Standards

TESTS may be carried out for two rather distinct purposes so far as their immediate objectives are concerned. These objectives dictate the manner in which the tests should be conducted. One objective of a test might be the establishment of a single scientific datum, such as the rate of corrosion of iron in an acid under specified conditions. In making a test to establish such a datum the procedure calls for the maintenance of known conditions all of which are under control and only one of which is varied. In such a test the reproducibility of the results depends largely on the skill of the tester in controlling his conditions and on the accuracy of his observations. If the results of the tests are positive, the data have definite value as a contribution to knowledge and this value is not diminished by lack of immediate usefulness.

The second type of test has for its objective usually the discovery of information of immediate use and directly applicable to some practical problem. This might be illustrated by an attempt to determine whether puddled wrought iron is superior to low-carbon steel as a pipe material for underground use. A scientist even slightly familiar with soils and corrosion might say offhand that there is no solution to such a problem and that no test to determine the answer should be attempted. Nevertheless, a large number of people think they know the answer to this problem, and decisions as to the expenditure of many thousands of dollars are based on the accepted answer to this and very similar problems. A financially endowed scientist might dismiss such problems and devote his energy to problems which he hoped to solve, but the scientist or engineer who has to work for the owners of a pipe line may find that he has to attempt to get some sort of an answer and to be able to show why his answer is not more complete.

The character of the soil-corrosion work at the National Bureau of Standards has been determined largely by the nature of the questions which it has been called upon to answer. The members of the staff recognize that before the practical problems can be completely solved some fundamental questions must be answered, but they also know it is unlikely that they could engage in pure research long enough to solve the practical problems via the fundamental research route. Roughly from a fourth to a third of the financial and man power of the soil-corrosion section of the bureau has gone into research related to the basic principles of corrosion phenomena. Almost all the cooperation from outside sources has been received in connection with more immediately practical problems. However, the two types of investigation are very closely related and the results of each are helpful to the other. It frequently happens that the fundamental principles governing a problem become evident only after the practical solution has been found. Much of our scientific information belongs to the class of explanations of why something occurred rather than to the class upon which predictions of future occurrences are based. One corrosion-research engineer has said in effect that it is much easier to explain why a material failed under certain conditions than to recommend one which will not fail.

Variability of Corrosion on Pipe Lines

Although it is possible for the soil surveyor to classify a soil at any point as to series and type, a pipe line unfortunately traverses many soil

TABLE 1—EXTREME VARIATIONS IN SOIL RESISTIVITY AND MAXIMUM PIT DEPTHS AT A.P.I. TEST SITES

Site No.—	Resistivities at pipe depth within a distance of 1,000 ft.—ohm-cm				Resistivities within vertical distance of 3 ft.—ohm-cm		Pit depths on control specimens after 10 yrs.—mils	
	1930		1940					
					At 12"	At 36"		
1	950	570	1,200	370	575	400	76	28
2	1,175	820	10,000	550	10,000	1,500	91	30
3	680	400	800	480	750	550	+216	81
4	2,150	450	2,500	900	2,500	1,100	120	43
5	4,300	1,400	9,000	1,200	10,000	1,600	74	28
6	13,200	1,000	10,000	1,800	10,000	1,100	89	30
7	5,800	2,850	2,000	850	3,000	650	105	31
8	480	290	525	280	700	260	+216	56
9	3,600	250	8,000	425	3,000	1,300	+216	45
10	2,850	1,200	4,000	1,500	5,000	1,600	86	39
11	3,200	250	5,000	175	4,000	300	125	28
12	8,800	100	not taken				108	87
13	1,600	600	600	300	600	375	104	20
14	6,750	1,165	*7,750	*1,270	....	....	67	36
16	300	110	400	75	225	150	+216	+129

*Measurements from surface of ground by Pearson apparatus.

TABLE 2—MAXIMUM[a] PIT DEPTHS[b] ON SPECIMENS OF IRON AND STEEL ALLOYS EXPOSED TO SOILS FOR 2 YEARS

No.	Soil Type—	Aeration		A .05 Cr .03 Ni .05 Cu .01 P	O .02 Cr .15 Ni .45 Cu .07 Mo	N .02 Cr .14 Ni .54 Cu .13 Mo	J .52 Ni .95 Cu .1 P	B 1.96 Ni 1.01 Cu .01 P	C 1.02 Cr .22 Ni .43 Cu .12 P	KK 2.01 Cr .07 Ni .49 Mo	D 5.02 Cr .09 Ni .01 Cu	E 4.67 Cr .09 Ni .51 Mo	H 5.76 Cr .17 Ni .27 Al .43 Mo
51	Acadia clay	Poor	X[d]	54	54	66	63	54	58	35	62	50	64
			X—X[e]	4	0	8.5	7	10	1.5	.0	7.5	7.5	
53	Cecil clay loam	Good	X	40	38	38	38	26	40	40	43	36	32
			X—X	9	6	5.5	4.5	2	2.5	6	3	2.5	
55	Hagerstown loam	Good	X	42	31	29	34	34	40	26	34	34	30
			X—X	1	1	1	0	0	4.5	0	1.5	1.5	3
56	Lake Charles clay	Poor	X	80	100	77	82	100	52	38	66	62	60
			X—X	1.8	5.5	12	0	10.5	1	1.5	0.5	3.5	
58	Muck	Very poor	X	36	30	32	26	36	71	29	48	39	48
			X—X	6.5	5.5	0	4	8.5	9	3	2	3	7.5
59	Houghton muck	Very poor	X	6	5	6	6	6	14	22	18	20	18
			X—X	2	2	2	4	2	2.5	.5	3.5	0	2.5
60	Rifle peat	Very poor	X	30	21	20	25	20	23	19	32	26	26
			X—X	2	5	6	7	1.5	2	1	2	3.5	4
61	Sharkey clay	Poor	X	34	33	32	53	62	30	31	30	26	24
			X—X	6	7	4	3	5.5	4	1.5	3	1.5	0
62	Susquehanna clay	Fair	X	34	36	36	38	51	36	26	32	26	32
			X—X	6	11	6	13	0	1.5	5	2.5	8.5	6
63	Tidal marsh	Very poor	X	18	20	33	14	22	31	20	62	46	42
			X—X	2		7	1.5	7.5	9	4.5	5.5	14	
64	Docas clay	Very poor	X	44	70	72	60	66	42	56	48	46	46
			X—X	8	7.5	16	6.5	9	12	4	6.5	14	12
65	Chino silt loam	Fair	X	47	44	32	49	45	50	56	37	39	50
			X—X	3	4.5	2.5	5	3	10	0	4	7	1.5
66	Mohave fine sandy loam	Good	X	86	105	132	108	38	56	78	59	81	72
			X—X	0	11	3.2	4.5	4	10	1.5	1	3	2.5
70	Merced silt loam	Poor	X	56	48	51	48	50	66	102	87	79	88
			X—X	1.5	.05	3	2.5	2	5.5	15	3	6	

[a]Average of two specimens. [b]In mils. [c]A dash indicates that only one specimen was examined. [d]X equals average. [e]X—X equals average deviation.

types differing widely in corrosiveness within its length. Moreover, a soil usually consists of several horizons which may differ in chemical composition, aeration, texture, water-holding capacity, and moisture content, all of which affect the rate of corrosion. Since the thickness of a soil horizon may vary from point to point, a pipe line may pass from one horizon to another within a relatively short distance. Within narrower limits, the soil type may also vary in a horizontal direction. Variations in the temperature and moisture content of soils also affect rate of corrosion.

The lack of uniformity of soil conditions and its effect on corrosion is illustrated in Table 1, which presents some of the data of the A.P.I. tests[1] of pipe coatings. The observations show the range of soil resistivities in 1,000 ft. of trench and the extreme variations in the maximum pit depths on approximately thirty-five 2-ft. sections of unprotected 3-in. pipe.

Additional evidence of the lack of uniformity in samples of soils supposed to represent the same soil type will be found in pipe-line data collected by E. A. Koenig.[2]

Field Tests

1. *Pipe materials.*—The influence of uncontrolled factors in field tests on the corrosion of ferrous metals in soils is illustrated by the data in Table 2 and by Figs. 1, 2, and 3. In Table 2 are shown the depths of the deepest pits on 10 ferrous alloys exposed for 2 years to corrosion in 14 soils.

Although the variations in pit depths may be considered fairly large, the data indicate that none of the alloying elements in the quantities added to the various steels had definite effects on the rate of pitting of these materials, at least for the initial period of exposure. While it may be contended that under the conditions of the test the inherent differences in the corrodibility of the materials cannot be detected, it is doubtful whether such differences would be of practical importance.

Data on the behavior of specimens of several irons and steels buried in 1932 indicate that significant differences in the behavior of this class of materials can be detected by the field tests. In Table 3 are shown the depths of the deepest pits on specimens of a variety of irons and steels after several periods of exposure. The data indicate a trend toward shallower pits on the specimens which contain 2.5 per cent nickel and 1 per cent copper (Material D). This tendency, while

(Continued on Page 146)

[1]Kirk H. Logan, A.P.I. Coating Tests—Final Report Proc. A.P.I. 21 (IV) 32, 1940.

[2]K. H. Logan and E. A. Koenig: A Comparison of Methods for Estimating the Corrosivity of Soils, Proc. A.P.I. 20 (IV) 25, 1939.

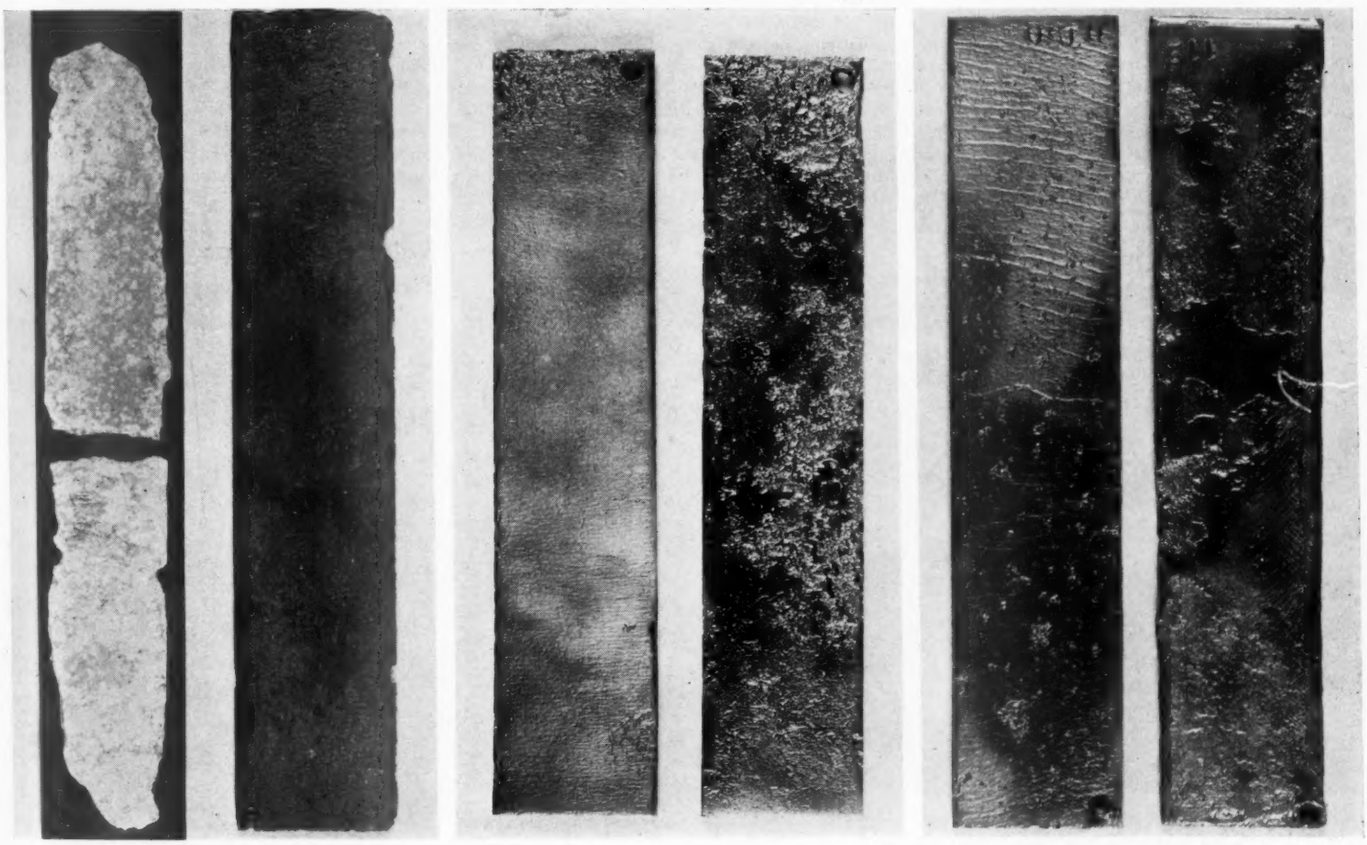


Fig. 1 (left): Two strips of zinc buried 2 years in site No. 67 (cinders). Fig. 2 (center): Top and bottom sides of 5 per cent chrome steel plate buried 2 years in Merced silt loam (site No. 70). Fig. 3 (right): Two types of corrosion due probably to accidental conditions pertaining to the specimens. The lines in the left specimen are the result of strains caused by cutting the metal with shears. The small round pits in the right specimen occurred on this material in several soils

TABLE 3—DEPTHS OF MAXIMUM PITS ON WROUGHT FERROUS SPECIMENS EXPOSED FOR DIFFERENT PERIODS (IN MILS)

Exposure	2 years						5 years						7 years					
Soil No.	Puddled wrought iron A	Puddled wrought iron B	Low-carbon steel N	5% Cr steel P	Cu-Mo open-hearth steel H	2.5% Ni 1% Cu steel D	Puddled wrought iron A	Puddled wrought iron B	Low-carbon steel N	5% Cr steel P	Cu-Mo open-hearth steel H	2.5% Ni 1% Cu steel D	Puddled wrought iron A	Puddled wrought iron B	Low-carbon steel N	5% Cr steel P	Cu-Mo open-hearth steel H	2.5% Ni 1% Cu steel D
51	50	60	82	69	79	68	144	+129	+154	105	+145	55	+122	+145	+135	106	97	70
53	34	30	37	46	55	23	64	71	50	56	65	26	77	76	54	57	92	44
55	41	43	43	42	60	33	79	84	57	65	75	34	70	60	57	88	68	51
56	22	25	20	58	21	20	66	65	71	+154	65	42	90	+106	+125	+154	+112	+145
57	18	20	32	25	50	31	94	+100	100	84	+113	71	...	...	...	...	...	...
58	20	18	18	36	21	23	68	64	103	70	60	71	84	110	110	70	+145	+110
59	...	...	...	...	...	...	25	18	20	32	5	3	18	15	30	20	10	14
60	25	24	37	33	27	28	38	37	24	67	21	26	30	34	17	62	16	14
61	*17	*10	*11	*10	*15	*12	41	37	54	37	59	30	44	50	63	38	65	51
62	49	70	62	52	72	42	54	56	66	83	86	46	69	78	71	+125	78	72
63	28	17	15	43	30	29	22	37	36	87	49	17	64	39	70	89	103	41
64	102	118	131	125	153	98	129	110	+154	+154	137	108	+144	+145	+154	+154	+145	+145
65	54	66	40	68	94	41	91	87	74	107	97	48	+110	106	83	+138	117	68
66	88	82	65	86	111	58	85	106	+154	133	+145	75	110	+140	+154	+154	+145	+141
67	101	99	+154	65	65	101	+145	+145	+119	+112	+118	+145	+145	+145	+127	65	80	+145

*Data for 1 year only.

Experience of Northern Natural With Large All-Welded Lines

By H. J. CARSON
Vice President, Northern Natural Gas Co., Omaha, Neb.

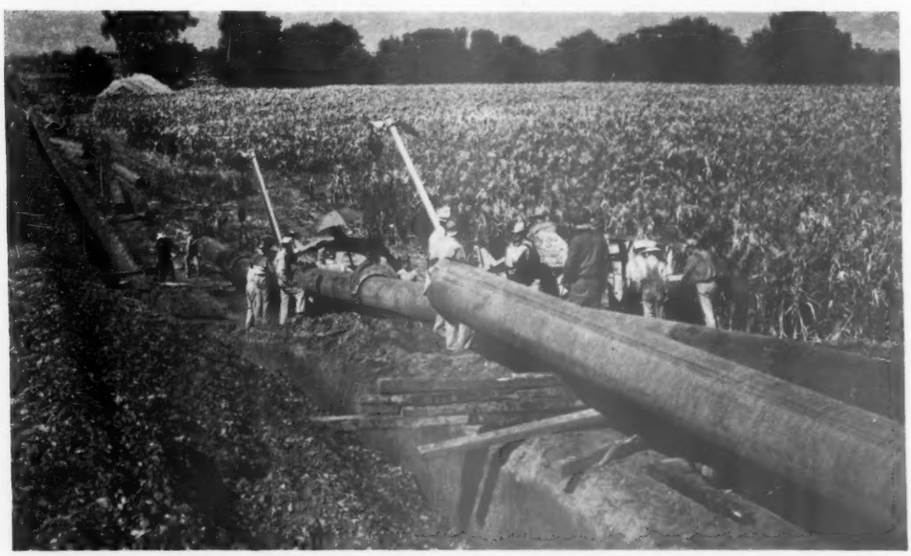
THE 243 miles of 16-in. all-welded pipe line completed by Northern Natural Gas Co. in 1939 has now gone through two winters and the 62 miles of 24-in. completed in 1940 through one winter without leaks or breaks and have proved the worth of this construction. Now under construction in four loops is 46.7 miles of 24-in.

The stovepipe method of welding with three beads all without chill rings has been used with excellent results on all 24-in. lines.

It may be said that the temperature range or difference between the temperature of the pipe at the time of laying and the minimum temperature in the line either in or out of service during winter months is a design factor which requires the same consideration as the maximum internal working pressure; i.e., temperature range is limited in the same way that internal pressure is limited.

An example of long-length solid-welded construction subjected to extremes of heat and cold under direct observation from day to day is furnished by the solid-welded rails of railroads. In a first installation made at a temperature of about 50° F., the rails had a slight tendency to kick out of line in warm or hot weather. In additional installations the rail was laid in warm weather so the temperature stresses set up in the rail would mostly be tensile, rather than compressive and no difficulties were experienced in maintaining the rail to line and surface.

The performance of such all-welded railroad rails is of interest in that rails have been maintained in place and alignment with a temperature variation of about 90° F. while undergoing heavy traffic and the impact effect at high speeds in addition to temperature stresses.



Laying 24-in. pipe near Washington, Kans., where solid welding with three beads, all without chill rings, was used. The stovepipe method for handling pipe was employed

Solid-welded construction in pipe lines has generally been limited to sizes varying up to 16-in. in diameter, although lines in larger sizes up to 26-in. have been built by this method. The determination of the maximum size in any area has evidently depended upon individual views regarding the integrity and strength of the welds and whether the strength of the steel in the pipe and the slack obtainable in the line are amply sufficient for overcoming the stresses caused by temperature changes in combination with the stresses due to internal pressure.

With improvements in all phases of welding and the increased experience and efficiency of welding personnel and a substantial background of experience in solid-welded lines, there is now little question regarding the integrity and strength of welds. The more uniform wall thickness, sizing and squareness of pipe ends as furnished by manufacturers have facilitated welding in the larger sizes.

Solid welding for large welded lines laid in a straight line has been advocated by some engineers and in any such cases the multiplicity of slight deviations from a straight line undoubtedly provide the equivalent of a small amount of slack as such deviations may do in solid-welded railroad rails. Although slack may not be necessary, the flexibility it provides adds something to the line and it should be installed as far as practicable.

Three beads were used on all rolling welds and three and four beads in the bell-hole and tie-in welds, all without backup or chill rings. In stream crossings, peat bogs and swampy places, the welds were reinforced by split welding sleeves. Both electrically welded and seamless pipe 16-in. o.d. ¼-in. wall was used, with a minimum yield point of 42,000 lb. and a minimum tensile strength of 60,000 lb. specified for the steel in the pipe. On each side of each main-line plug valve the pipe was anchored by concrete blocks with plates, reinforced by gussets, welded to the pipe and bearing on the block.

Solid welding facilitated and expedited the use of field traveling-type machines in cleaning, priming, coating and wrapping, and effected substantial over-all economies throughout.

The three bead welds without chill rings were very satisfactory and are believed to be better than two bead welds with chill rings. With the small rod and narrow spacing of the pipe, complete penetration was secured with the welding-rod metal extending to the bottom of the weld. In securing such complete penetration with the first bead, there was an absence of icicles on the inside of the pipe and a gain in clearing the inner surface through the elimination of chill rings.

●

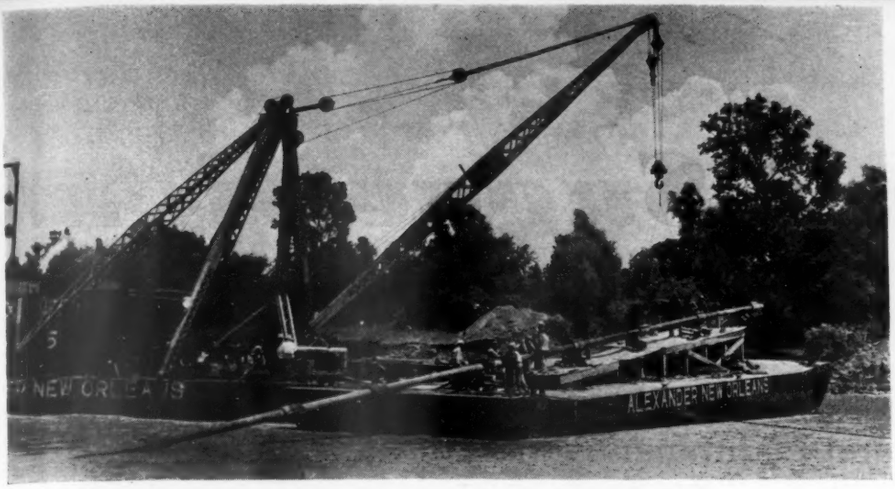
Valuation of Texas Pipe Lines Decreases

Because of increases in federal income taxes on Texas pipe lines, their intangible values, basis for the state intangible tax, dropped $2,172,025 during the last year to a total value of $45,107,975, according to Comptroller George H. Sheppard.

Intangible values are calculated according to the earning power of the company, and as the federal tax increased from 16½ per cent to 24 per cent, the intangible value decreased.

A complete list of pipe lines and their 1941 intangible values follows:

Atlantic Pipe Line Co.	$4,455,000
Gulf Refining Co.	3,608,875
Humble Pipe Line Co.	8,306,200
Magnolia Pipe Line Co.	2,572,000
Shell Pipe Line Corp.	3,010,000
Sinclair Refining Co.	5,894,200
Texas-New Mexico Pipe Line Co.	2,897,400
American Liberty Pipe Line Co.	525,000
Arkansas Pipe Line Co.	285,000
Barnsdall Pipe Line Co.	351,300
Duval Pipe Line Co.	320,700
Empire Pipe Line Co.	116,750
Pan-American Pipe Line Co.	1,326,600
Pasotex Pipe Line Co.	662,200
Pure Transportation Co.	902,000
Republic Pipe Line Co.	704,500
Standish Pipe Line Co.	94,100
Sun Pipe Line Co.	1,400,000
Texas-Empire Pipe Line Co.	2,902,900
Tidal Pipe Line Co.	601,350
Toronto Pipe Line Co.	95,000
Yount-Lee Pipe Line Co.	787,300
Amsco Pipe Line Co.	200,000
Continental Pipe Line Co.	190,400
M-A-R Pipe Line Co.	103,100
Southern Pipe Line Co.	246,600
Alamo Pipe Line Co.	20,000
Arcadia Bee-Line Co.	500
Bell General Transit Co.	63,200
Bryson Pipe Line & Ref. Co.	4,500
Cardinal Pipe Line Co.	2,100
Comanche Pipe Line Co.	10,000
Cooke Pipe Line Co.	6,000
Cordele Pipe Line Co.	28,000
Corpus-Rosa Pipe Line Co.	30,500
Cosden Pipe Line Co.	5,100
Crown Central Transportation Co.	20,000
Eastern Pipe Line Co.	2,000
Hemby Pipe Line Co.	1,000
P. G. Lake Pipe Line Co.	4,500
McCutcheon Pipe Line Co.	4,500
Old Ocean Pipe Line Co.	27,650
Panola Pipe Line Co.	21,000
Pine Pipe Line Co.	7,000
Pontiac Pipe Line Co.	13,500
Reagan County Purchasing Co.	27,300
Rotan Pipe Line Co.	2,750
Rusk Oil & Refining Co.	5,400
South Plains Pipe Line Co.	9,800
Maco Stewart Pipe Line	3,700
Talco Pipe Line Co.	96,700
Transport Oil Co.	600
Webb County Gathering System	15,000
Wickett Pipe Line Co.	3,300
Texas Pipe Line Co.	2,118,400



Left: In laying three 10-in. gas lines across the Mississippi River north of New Orleans, a derrick barge, left, and a work barge, right, were used. The completed line, extending to the left of the picture, is supported and gradually lowered to the river bed by three auxiliary barges. A materials barge lies alongside the work barge, in the background. Below: An inclined ramp raised about 25° was built on the work barge. Here a new section has been lined up in the welding clamp. The barges were attached to anchors set in the river bed, to prevent interference with river traffic. Ten such anchors were set in the river, and the barges were moved from anchor to anchor by tug boats. The river clamps, weighing 1,000 lb. apiece, have been attached to the section about to be welded, and others lie on the ramp for the next section.

Mississippi River Crossings Laid in Record Time

By GEORGE WEBER

FIFTEEN miles up the Mississippi River from New Orleans, pipe-line history was made in July when United Gas Pipe Line Co. laid three 10-in. lines across the swiftly moving stream in 7 days. Part of a 200-mile project which will connect the fields of southern Louisiana with industries and cities along the Gulf Coast to Mobile, Ala., and Pensacola, Fla., the river crossing was the second laid at this location in a little more than a year.

Beginning on the east bank of the river, which is 2,800 ft. wide and approximately 90 ft. deep at this point, line was laid over the levee to approaches cut into the bank. Once in the river, a string of barges was used.

A materials barge carrying pipe lay alongside the work barge. The work barge was a standard steel barge on which was constructed an inclined ramp covering more than three-quarters of the barge's length. At the foot of the ramp was the welding clamp in which the joints of pipe were lined and welded before being lowered into the river. Heading into the downstream side of this barge was the derrick barge which from this position could handle pipe on the work barge and the materials barge.

Shore anchors would interfere with navigation,

(Continued on Page 145)

Left, below: Here the lineup man signals the derrick man to bring the new section into alignment, and welders stand by to make the connection. All welds were carefully inspected before lowering the lines to the river bed. One of the heavy river clamps can be seen in the left foreground. Right, below: Nearing the west river bank, the derrick picks up the last section of pipe from the materials barge, to lift it over to the work barge on the right. River clamps are attached on the work barge.

Practical Suggestions

Short, Illustrated Ideas on Pipe-Line Operation and Maintenance . . .

Edited by Paul Reed

Equipment for Removing and Repairing Exhaust Valves

This unit was designed and built by employes of a natural-gas pipe line for removing and repairing exhaust valves of compressors. It consists of a track and carriage for easy removal of the valve from lower part of compressor, and a rack for the valve during repair. A center and balancing shaft with the bolt on the exhaust side of the valve, allows the valve, when set in the frame, to be so balanced that it can be turned at any angle. The unit cuts actual repair time in half and requires two men instead of the three formerly required.

Fork and Hoist Used for Moving Exhaust Valves

Unless special equipment is made for moving exhaust valves during overhaul periods at compressor stations, these heavy parts require considerable labor on the part of several men in the crew. For certain types of compressors a goose-neck device has proved to be satisfactory in several organizations; this has been described as it has been used in different forms in the Practical Suggestion sections of The Oil and Gas Journal in previous years. In the accompanying illustrations a fork-shaped device is shown which is used in connection with an overhead crane for moving exhaust valves. It can be seen that the ends of the forks are reinforced to give additional strength at the point where they are placed against the valve to lift it. A handle of sufficient length has been provided to make it possible for an operator to have enough leverage to raise the valve readily. Using this device with the overhead crane makes it possible to take an exhaust valve to any part of the station without difficulty.

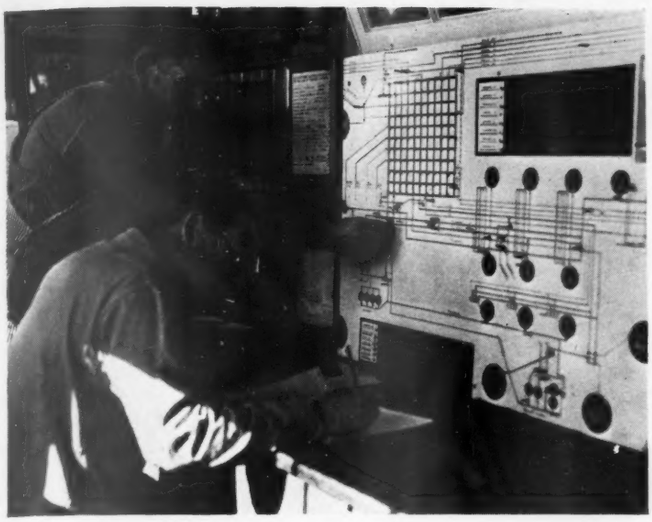


Diagram to Aid Oil Dispatcher

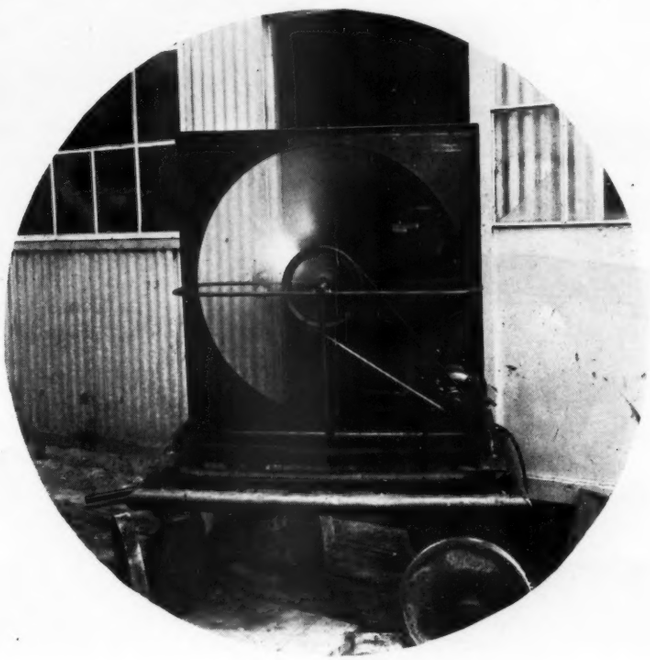
Special diagrams and models have been devised by pipe-line companies for the purpose of showing as clearly as possible the relation between lines, valves, tanks, and pumps. Attention given to bringing out details, more clearly than they may be seen in a blueprint, often saves time and trouble, particularly where systems are complex. The accompanying photograph shows a specially prepared diagram which has been placed on the wall so that it faces the oil dispatcher as he works at his desk.

Pneumatic Drill Is Utilized For Bolting River Clamps

The work of attaching river clamps to pipe has been speeded up by equipping a hydraulic drill with a socket which fits over the head of the bolt. One man holds the nut on the underside of the clamp while the pneumatic drill is used by the operator to turn the bolt. Without this power equipment the time taken for bolting river clamps in position by hand is considerable.

Portable Air Blower for Pump Station

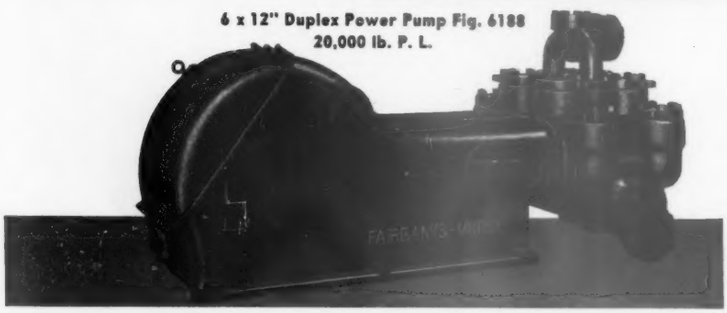
At a main-line pump station of a major pipe-line company such operations as pulling pistons and other repair work is conducted under improved conditions, especially in hot summer weather, by the use of a portable air blower which is placed near a door. This insures the passage of a cool stream of air and the removal of fumes and foul air. This equipment for blowing air into the station is a conventional type of blower driven by an electric motor. A long extension cord makes it possible to place the blower conveniently. The blower is mounted on a frame work fabricated by the company welder. This is placed on a small truck equipped with an extension handle for moving about the plant.



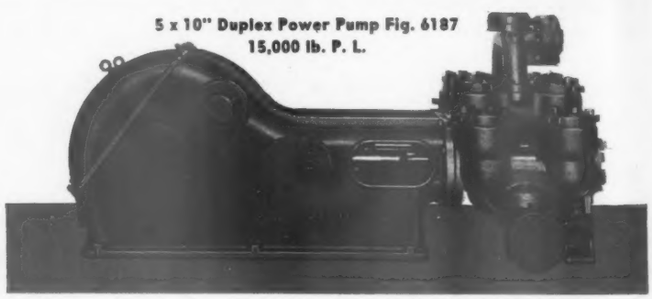
Hydraulic Jack Removes Dents From Pipe

This device, designed and developed by a Monroe, La., employe of a natural-gas pipe-line organization, will straighten dents and sags in large-diameter pipe, in from 1 to 3 minutes. It consists of a homemade jack with a capacity of 20 tons; this is welded to a ½-in. line-pipe handle, and operated by a standard pump. It obviates the necessity of cutting out bent sections and rejoining pipe by welding. It has proved satisfactory in over 1,900 tests. Work is controlled by the handle which is turned by one of the operators so that the jack is held in the position where it will apply pressure effectively in removing indentations.

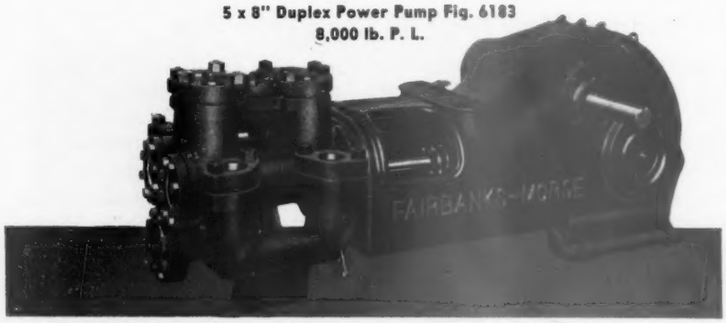
6 x 12" Duplex Power Pump Fig. 6188
20,000 lb. P. L.



5 x 10" Duplex Power Pump Fig. 6187
15,000 lb. P. L.

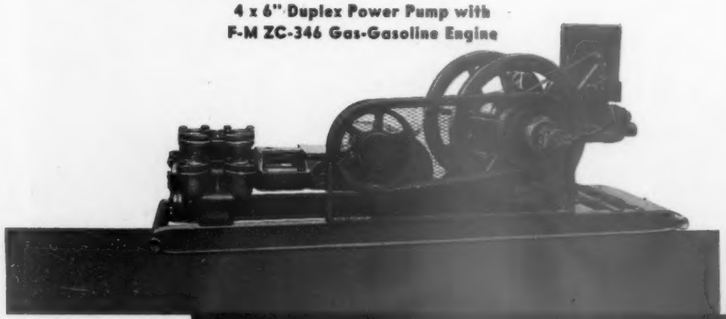


5 x 8" Duplex Power Pump Fig. 6183
8,000 lb. P. L.

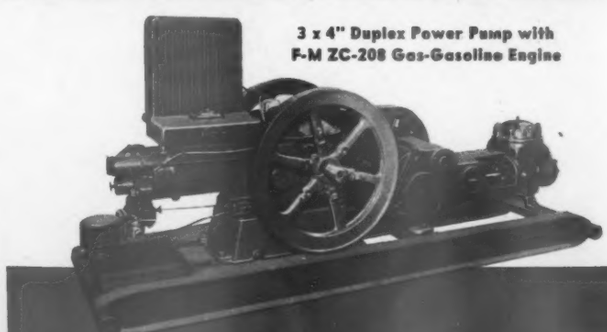


4 x 6" Duplex Power Pump Fig. 6182
6,000 lb. P. L.

4 x 6" Duplex Power Pump with
F-M ZC-346 Gas-Gasoline Engine



3 x 4" Duplex Power Pump with
F-M ZC-208 Gas-Gasoline Engine



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Pipe lines are the primary arteries of national defense, and pumps transmit the force required to *keep 'em flowing*. Fairbanks-Morse is ready to meet today's challenge with a new line of power pumps designed on sound engineering principles . . . backed by more than a century of experience. Precision made parts from carefully selected raw materials result in a pump capable of delivering a smooth dependable flow under the most adverse conditions. Rugged frames—enclosed working parts—heavy duty roller bearings—splash lubrication—removable bronze, cast iron or steel liners—bronze, stainless steel, cast iron, bakelite, or rubber valves are a few of the outstanding features of these well designed F-M Power Pumps.

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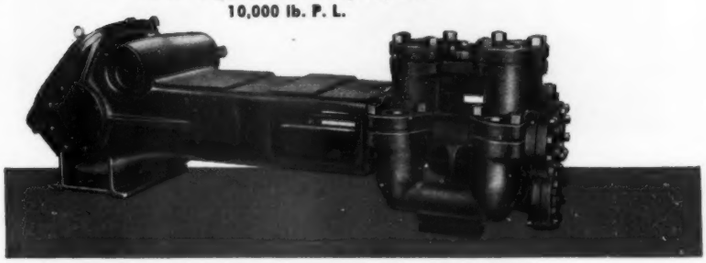
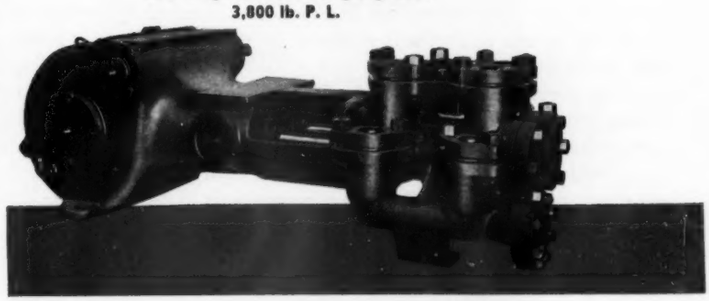
SERVING THE OIL AND GAS INDUSTRIES

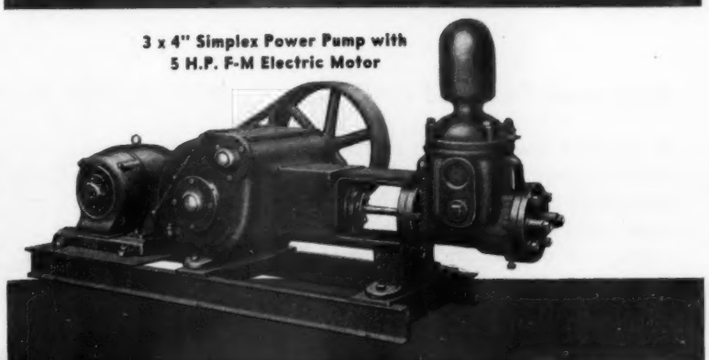
5 x 10" Duplex Power Pump Fig. 6185
10,000 lb. P. L.



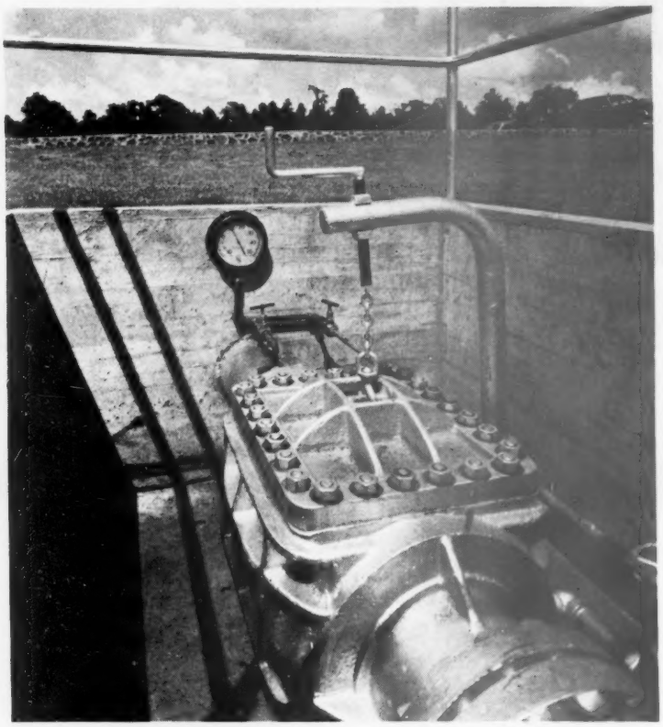
4 x 6" Duplex Power Pump Fig. 6181
3,800 lb. P. L.



3 x 4" Simplex Power Pump with
5 H.P. F-M Electric Motor



Practical Suggestions

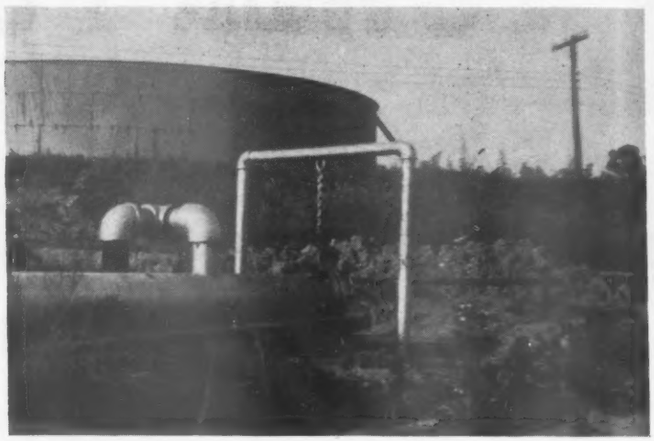


Crane and Hoist for Servicing Strainer

In order to facilitate the work of removing the heavy plate from the top of a strainer when it is necessary to clean, special equipment has been provided. This consists of a crane made in the form of a davit. The plate is lifted by a hook attached to a chain which is fastened to a turnscrew that is raised and lowered by turning a crank. By means of this, it is possible for one man to easily raise and lower this heavy plate which would ordinarily require the work of several men. At this installation the pipe-line company makes a practice of using only one gage to test the upstream and downstream pressures on either side of the strainer. Connections are provided on both sides of the strainer for a pressure gage. By using one gage it was found that arguments as to the accuracy of gages were obviated since same gage must be used at both points.

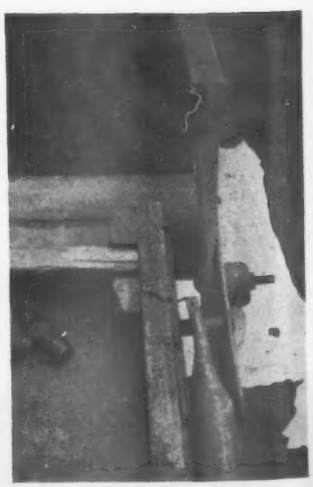
Frame for Supporting Blind Flange at Scraper Trap

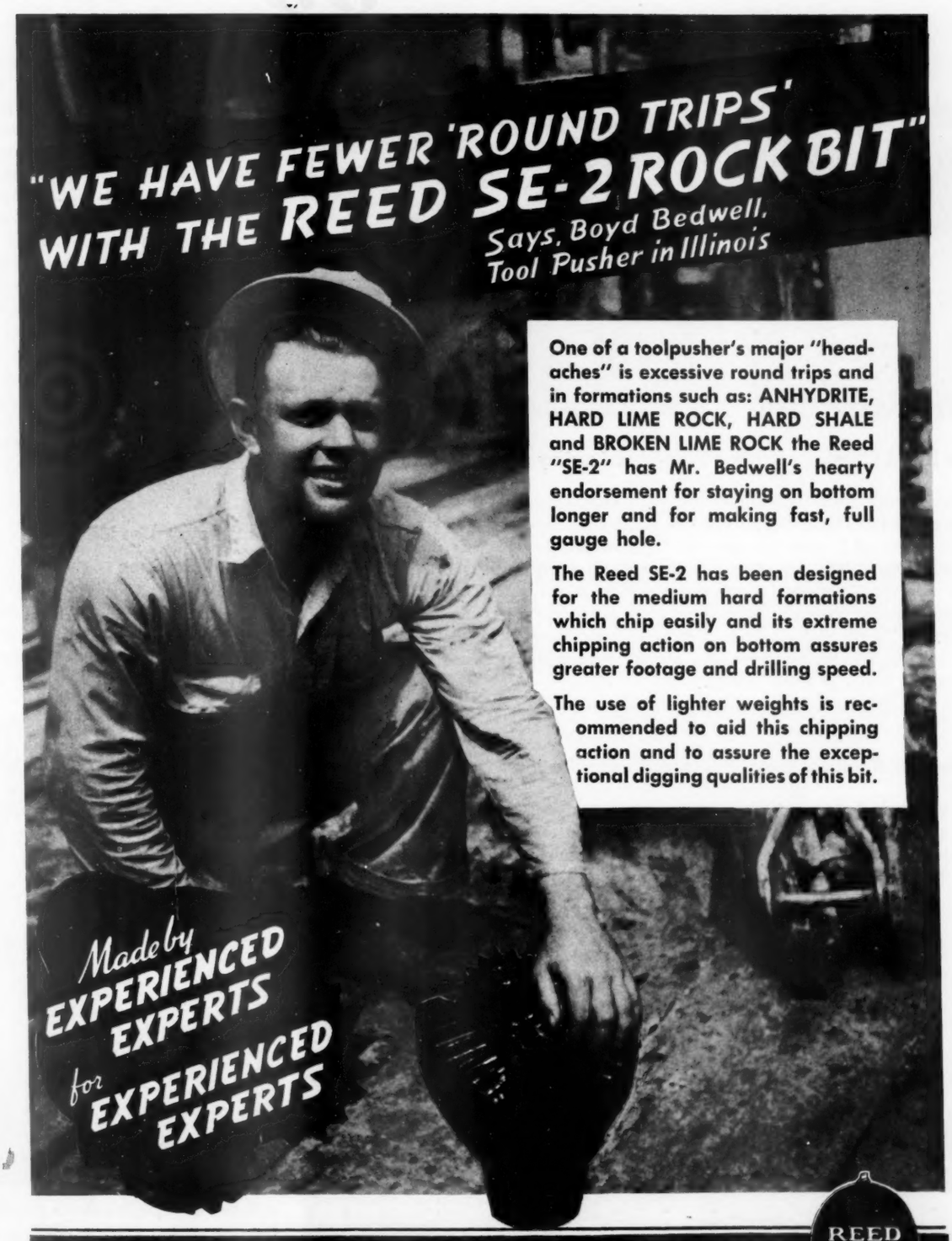
A crude-oil pipe-line company has installed a frame made of 2-in. pipe with a chain suspended from it. The chain is used for supporting a blind flange on a scraper trap. The use of this means of supporting the flange when it is removed from the end of the pipe eliminates the need for unnecessary lifting.



Equipment Designed for Holding Tools While They are Being Sharpened

A pipe-line company has adopted simple equipment which can be conveniently installed for holding hand tools when they are sharpened in the field. Provision has been made for sharpening these tools at the rear end of a truck. A slot has been made by cutting the end of the steel frame at the side of the truck and fastening to it a plate which has a perforation providing for the insertion of an eye-bolt from the inside of the slot. Over the threaded part of the eye-bolt, which protrudes on the other side of the plate, a 2-in. hollow bushing is placed; this is held by a nut. The handle of the tool to be sharpened is inserted through the ring in the eye-bolt and is held securely in place after the nut has been tightened.

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One of a toolpusher's major "headaches" is excessive round trips and in formations such as: ANHYDRITE, HARD LIME ROCK, HARD SHALE and BROKEN LIME ROCK the Reed "SE-2" has Mr. Bedwell's hearty endorsement for staying on bottom longer and for making fast, full gauge hole.
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Practical Suggestions

Bridge for Road Crossing During Pipe-Line Laying

In the construction of a gasoline and refined-products pipe line in Texas special arrangements were made to keep country roads in usable condition where they were crossed by the ditch when laying operations were in progress. The bridge was made so that the pipe was laid across it with the top of the pipe approximately flush with the surface of the bridge. The pipe was in a position where it could be readily picked up later by the tractors accompanying the gangs which follow the pipe gang, such as the cleaning, priming, and paint gangs. Yet all of this time the road was open for traffic. When the line was first laid on the bridge, a temporary wrapping was put on the pipe by hand to prevent it from being injured by traffic passing over it.

Chain Drive for Reciprocating Pump at Pump Station

In meeting demands for increased capacity for moving crude oil northward through a trunk line, a major oil company has been confronted this summer with the necessity of placing idle equipment in operation in the shortest possible time. At one station a diesel engine had been previously removed from a pumping unit. In order to use the reciprocating pump in this unit, which remained at the station, it was necessary to procure a new source of power. A 700-hp. electric motor was purchased but it was found that owing to the delays due to present emergency conditions, it was impossible to obtain reduction gears without waiting several months. At first a single chain drive was considered but this solution of the problem was discarded because of difficulties presented in procuring a suitable chain as well as the operating difficulties. It was decided to use a drive employing four chains of a standard size which can be readily procured. Sprockets were made at a local machine shop and equipment for the chain drive was installed to operate in an oil bath. The motor operates on current purchased from a utility company.

Shutdown Device for Diesel Engines

Several types of emergency shutdown equipment have been installed by pipe lines to make it possible to stop engines quickly by means of controls which may be manually operated at a place outside the station building. By pulling a wire cable, a mechanism is actuated at the engine which releases a pin which holds the exhaust valve open. The illustration shows the chief engineer holding a handle which is attached to the cable of the shutdown device. This is particularly valuable in time of fire or under any conditions which make it dangerous for the crew to remain inside the building in order to shut down the machinery.

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When drilling in a well, the investment has been made. When cleaning out the well, the investment has been proven. In either case, the risk of loss is at its peak, and it is wisdom to minimize it. Spang Cable Tools offer you the greatest safety factor.

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SPANG THE BIGGEST NAME IN CABLE TOOLS

Practical Suggestions

Assembly-Line Practices Adopted For Reconditioning Operations

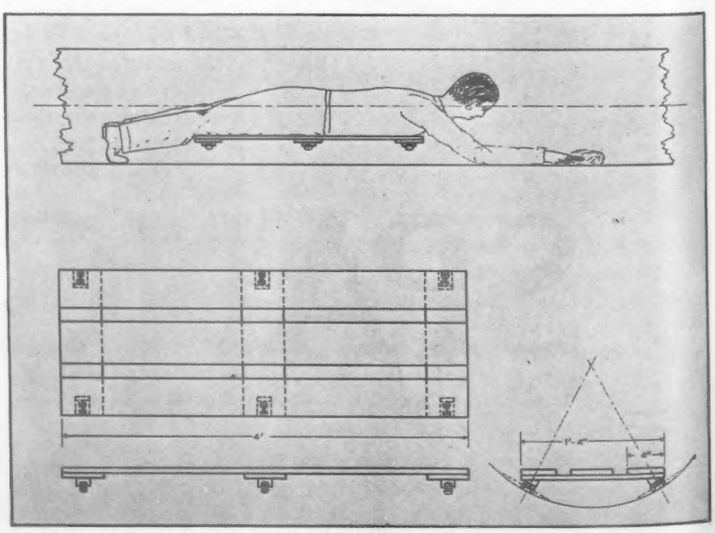
Pipe for the construction of an outlet for an active Mid-Continent producing area is being obtained by taking up and reconditioning a line which was laid nearly 20 years ago. Pipe has been brought to the grounds of the pump station of the crude-oil pipe-line system, for which the work is being done, where reconditioning equipment is installed. From the pipe-straightening machine the pipe travels over a continuous set of rollers to the cleaning machine. After leaving the cleaning machine, pipe rolls over a frame where the inspector examines each joint to see whether it comes up to specifications. If it does not meet specifications the joint is sent back to the straightening machine along the rollers seen at the right. The rollers used with this equipment are all made from short nipples of used pipe. Joints which pass inspection pass on to racks seen at the extreme right where they are graded, collars and threads are cut, and where the pipe is beveled preparatory to use in a welded line.

Pipe Hooks Reduce Accidents At Reconditioning Yard

A major crude-oil pipe-line company specifies that pipe hooks should be used for moving joints of pipe over rollers at reconditioning yards. By insisting that men use pipe hooks instead of their hands it has been found that a serious cause of accidents can be eliminated. While operations are planned so as to proceed at a steady rate, there is always the possibility that a joint of pipe following behind may travel faster than expected. As a result a hand may be crushed. Equipment at this yard is substantially built for efficient operation; it is an example of the careful preparations made by the industry for salvaging pipe.

Workman Swabs Inside of Pipe

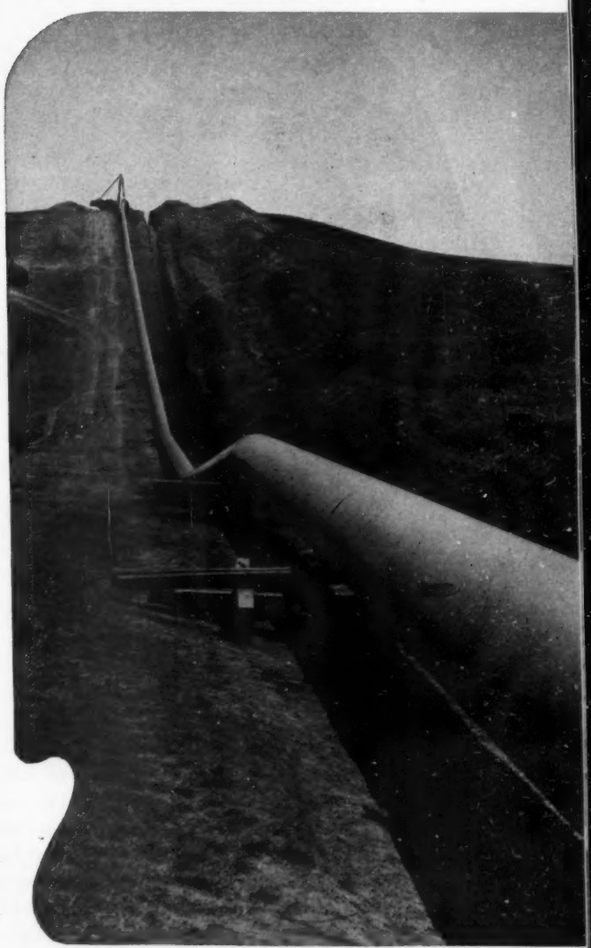
The swabbing of sections of pipe in the construction of large-diameter lines usually takes a considerable amount of time and effort which can be saved when a man is sent through the section to do this work. In the laying of a 24-in. natural-gas line the practice of sending a man through a section of several welded joints has proved to be successful. To facilitate this operation a wooden rack was made on which the man lies. To the underside of this rack, roller-skate runners were attached which enabled the man to propel himself rapidly through the section by using his feet and one hand while he wiped dirt with rags held in the other hand. Except for the fact that the runners were placed so they would roll along the curved surface inside the pipe, this special rack, in general appearance, resembles racks used by garage mechanics for sliding under cars and trucks while making repairs.



OVER 10,000 MILES . . .
OF PROOF

Same pipe shown at right being coated with hot Bitumastic 70-B Enamel and simultaneously spiral wrapped. Line travelling machine is in center moving up hill.

Part of 400 miles of 26-inch O. D. pipe laid by Natural Gas Pipe Line Company of America, after being cleaned and primed with Bitumastic 70-B Priming Solution. A line travelling machine was used. 40 miles of 20-inch O. D. pipe for river crossings were similarly coated.



Pipelines protected against corrosion with Bitumastic Enamel placed in one continuous line would extend considerably more than 10,000 miles—or nearly half way around the earth.

Time and again leading pipeline companies have selected Bitumastic Enamel to protect initial installations—because of its past record of performance—and have continued to use it on later additions because periodic inspections of the first line were so satisfactory.

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Practical Suggestions

Pipe Lines Supported in Gulf Coast Marsh

In the marshes of the new Oasis Bay field on the Gulf Coast, two 3-in. oil lines are supported at intervals of 10 ft. with pieces of piling 3 ft. long. By raising the pipe above the surface of the ground, it is kept away from the corrosive effect of the marshy soil which is subject to inundation at high tide. The line is securely fastened to the timber supports by steel straps.

Portable Welding Unit for Pipe Lines

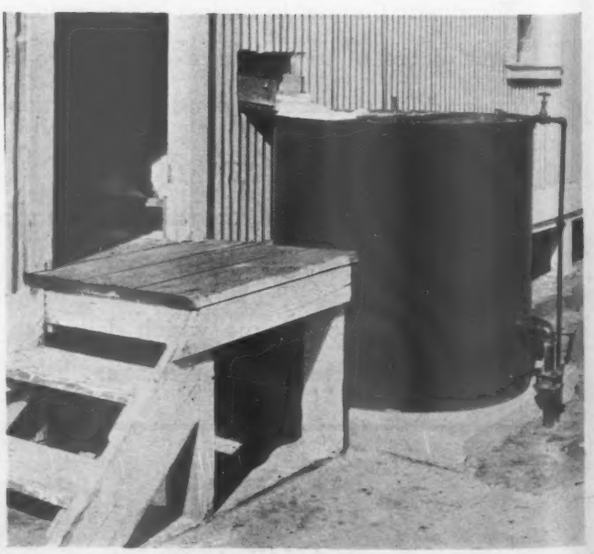
Much thought has been given to the planning of portable welding units which will serve the needs of maintenance men most effectively. A major crude-oil pipe-line organization has built welding units of several types which incorporate the ideas of men concerned with field operations. One of these units, which has been developed in what might be called a process of evolution, has several unique features. At the front of the housing special provision has been made for holding welding rods of three different types by furnishing a case which consists of three tubes with a cover. On both sides of the unit are long boxes used for holding welding cable and tools. These are built in such a way that the covers serve as convenient work benches. When the unit is stationary it can be held in a level position by a standard which is adjustable so that the front end of the unit may be raised or lowered to any height required by working conditions. The unit is equipped with air brakes operated by the driver of the truck towing the unit.

Detachable Guard for Gathering-System Unit

A company operating a crude-oil gathering system in Illinois uses portable pumping units which are placed in the open. A guard around the belt has been installed which has been fabricated by a welder. Provision has been made for dismantling the guard by having union connections in the rails near the upright stantion.

Handling Salt for Water Softener

At a pipe-line station in California, where a water softener is operated in connection with the engine-jacket-water system, provision has been made for improving the way in which the salt is handled. The brine tank was moved to a position adjacent to the salt house where it was placed on a concrete foundation made in such a way that the top of the tank would be at a height convenient for shoveling in the salt. Bags of salt are stored in a pile in the salt house. Salt bags are opened and the salt is dumped into a salt bin near the tank. In charging the tank, salt is shoveled from a bin, inside the building, and goes by a chute into the salt tank. In addition to making the work easier, this arrangement insures protection for the material handled.



Laying 26-In. Loops in Texas And Kansas for Chicago Line

ONE of the current year's interesting construction projects is the laying of more than 400 miles of 26-in. pipe which represents the first step toward building a complete line from the Texas Panhandle to Chicago. This is the largest-diameter pipe used in natural-gas pipe-line systems. The laying of this line was contracted by three contractors. This article deals with the work done by W. A. Bechtel Co., San Francisco, Calif., in building the recently completed sections totaling 122 miles and a series of multiple river crossings in Iowa where three distinct methods were employed to meet a variety of conditions. Work on the sections contracted by C. S. Foreman Co., Kansas City, Mo., and O. E. Dempsey Construction Co., Tulsa, will be described in another article.

Construction of the Texas-Kansas line for the Texoma Natural Gas Co. and the Natural Gas Pipeline Co. of America was started May 1, 1941, and completed August 16, 1941. The line consisted of 122 miles of 26-in. o.d. solid-welded pipe and appurtenances in two sections. Thirty-three miles of the new line are located in the Texas Panhandle and 89 miles in the rolling plains of southwestern Kansas.

Built for joint use by the two pipe-line companies, the line parallels an existing 24-in. line built in 1930 by W. A. Bechtel Co. This addition to present facilities provides increased capacity from natural-gas fields in Texas to patrons in the Great Lakes region.

One complete main-line gang and approximately 50 units of power equipment were employed for 72 days in the course of construction. Earlier work was carried out under difficulties imposed by unfavorable weather. Rainfall in the Texas Panhandle during May reached an all-time high. Heavy windstorms also occasioned shutdowns. On the Kansas section, rain, wind, and later the intense heat, caused delays.

Nevertheless, during construction the pipe-line companies' engineers recorded peak footage for the contractor's daily operations as follows: Trenching 14,300 ft., line-up and weld 12,400 ft., tie-in and bends 14,400 ft., clean and prime 15,400 ft., coating 15,200 ft., lowering 14,800 ft. It is believed this rate of progress establishes a new record for pipe-line construction of this size.

The contour of the country necessitated heavy right-of-way work and the installation of numerous bends. Factory bends in angular deflections of 1°, 2°, 3°, 4° and 5° were installed. Where bends in excess of 5° were required combinations of factory bends were used. Minimum trench width was 42 in., minimum depth 6 ft. 1 in. Sand formation in some regions caused trench cave-ins and required the use of a clamshell bucket and a considerable amount of hand mucking.

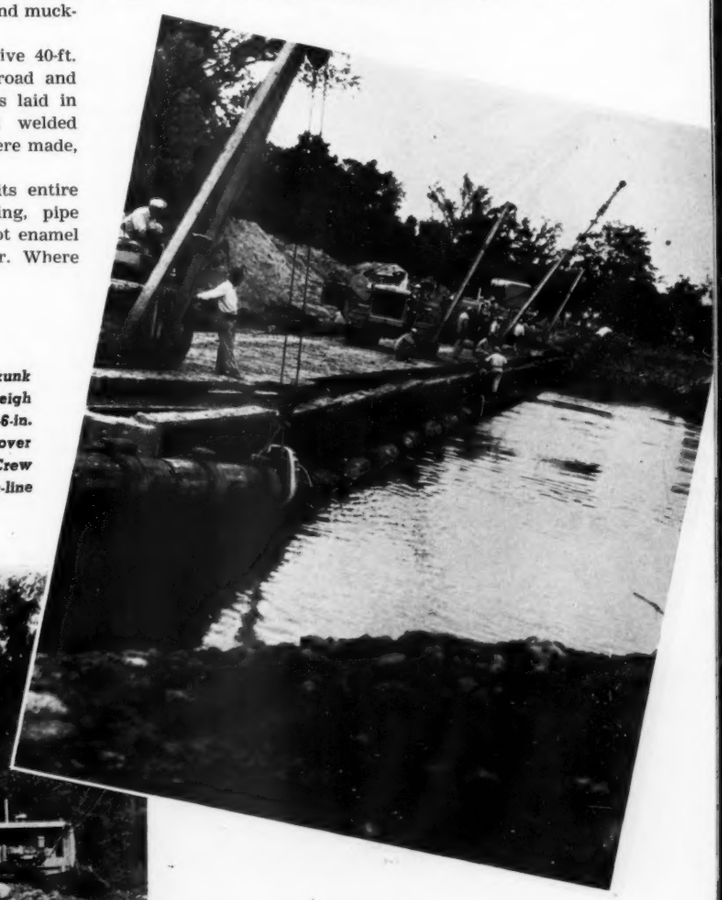
Pipe was head welded with five 40-ft. sections to each joint. At railroad and highway crossings, the line was laid in ⅝-in. steel casing with solid welded joints. Sixteen such crossings were made, the longest measuring 445 ft.

The line was treated along its entire length. After thorough cleaning, pipe was primed, and coated with hot enamel covered by bonded kraft paper. Where the backfill contained clods or broken rock, additional protection was supplied by the use of wood mats installed around the pipe. Before lowering, the line was tested with a holiday detector carrying 18,000 volts.

Vertical loops were used for securing slack. This 26-in. line contains from 24 to 30 in. of slack per mile. An interesting construction feature was the laying of slack loops without making a cut in the line.

After-Grading Completed

Backfill was cleaned up and dressed in a manner permitting landowners to cultivate over the pipe line immediately after construction was completed. Since much of the line traversed agricultural sections this feature of the job was an important consideration.



Right: Lowering from trestle, Skunk River crossing, Iowa. Clamps weigh 1,075 lb. each, are spaced on 9-ft.-6-in. centers. Wood matting wired over enamel and kraft paper. Below: Crew bending 20-in. pipe, on a multiple-line river crossing in Iowa

For the Natural Gas Pipeline Co. of America, the contractor is now engaged in constructing a number of river crossings in Iowa. The work consists of 20-in. double-line river crossings. The lines are on 30-in. centers with appurtenances across the following streams and their approaches: Missouri River bottoms and Keg Creek, Silver Creek, West Nishnabotna River, East Nishnabotna River, Seven Mile Creek, West Nodaway River, Middle

Nodaway River, Skunk River, North Skunk River, Iowa River, and Cedar River.

On each crossing it is necessary to clear and grade the right-of-way, unload, haul, trench, weld, field-bend, prime, coat, wrap, lay pipe, and backfill; restore the right-of-way to its original condition; install headers complete with valves and fittings and tie in to 26-in. main-line pipe wherever it has been previously installed. A crossover connection to the present 24-in. main line is required at the North Skunk River crossing, and two railroad and three highway crossings are involved.

Pipe Used

Pipe used is 20-in. o.d., ⅜-in. wall thickness, 78.6 lb. per lineal foot with 40 ft. per nominal length of joint. The usual procedure is to tack and roll-weld five lengths, followed by the tie-in and bending operations. The protective treatment consists of a primer coat followed by one coat of hot enamel wrapped with bonded kraft paper. Coated pipe rests on rubber-lined cradles to avoid injury to the coating. After electrical inspection, the pipe is lowered directly into the trench. In lowering, the line is supported over the trench at intervals approximating 800 ft. and rests on trench bottom between the supports. After backfilling the portions of slack loops resting on the bottom of the trench, the suspended sections of pipe are lowered and the backfill completed.

On dry land the trench was excavated to a minimum width of 30 in. and to a depth necessary to provide a minimum coverage of 3½ ft. In fairly solid and dry soil a trenching machine is used for this work. Where deep trenching is required, and where sandy soil or high water table result in unstable trench walls, diesel cranes equipped with drag or clamshell buckets are employed. On the Skunk River, it was necessary to excavate the trench through hard limestone on both sides of the river, entailing the use of dynamite, jackhammers, and a diesel shovel equipped with a backhoe.

In the channel proper the line was installed in a horizontal position for the full width of the stream, with a minimum coverage of 5 ft. measured from the lowest point in the stream bed. Sag bends and overbends connect pipe ends to dry-land sections. Pipe to be laid under water was welded as a single unit, girth welds were reinforced with split welding sleeves and bends completed. After coating, river clamps each weighing 1,075 lb. were installed on 9-ft. 6-in. centers, to overcome buoyancy. Between clamps a wrapping of wood matting was tightly wired over the coating as an added protection.

The method of constructing trenches across streams and lowering channel sections of pipe varies with the width of the stream and the type of soil structure through the stream bed. Three methods are in use.

Typical of a river requiring dredging is the Iowa, 420 ft. wide at the point of crossing, necessitating 450 ft. of level pipe in each line. Excavation of the two channel trenches was accomplished by means of a suction dredge equipped with a cutting ladder, all mounted on steel pontoons. Steel pipe was driven on 4-in. centers staggered from one side of the ditch to the other, loaded with dynamite, and shot. Dredging was then completed. At a point on the bank, the river pipe was welded, coated, clamps applied, sag bend made, and enough pipe welded on both ends to bring the final tie-in above the water line. After a thorough sounding of the excavated trench, the entire section was carried to the water's edge by sideboom-equipped tractors, the end of the pipe projecting about 50 ft. from shoreline. This loose end was then winched up to the under side of a small barge, ready to pull across the river.

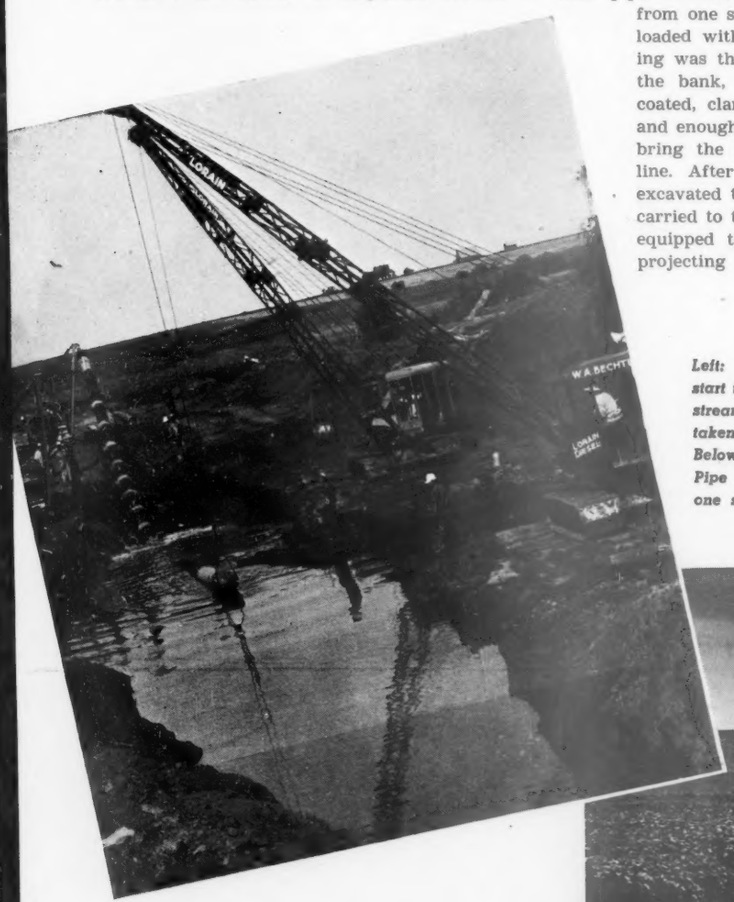
The cable for pulling was anchored to a deadman on the opposite bank, then through a double block, back through a single block anchored to a ¾-yard dragline, then back through the same double block and the end fastened to a winch mounted on a tractor. The double block had a hook to which the main 1⅛-in. pulling cable was attached. The cable was fastened to the river pipe section by means of choker slings around the pipe immediately behind a river clamp close to the end of the string.

Use of Barge

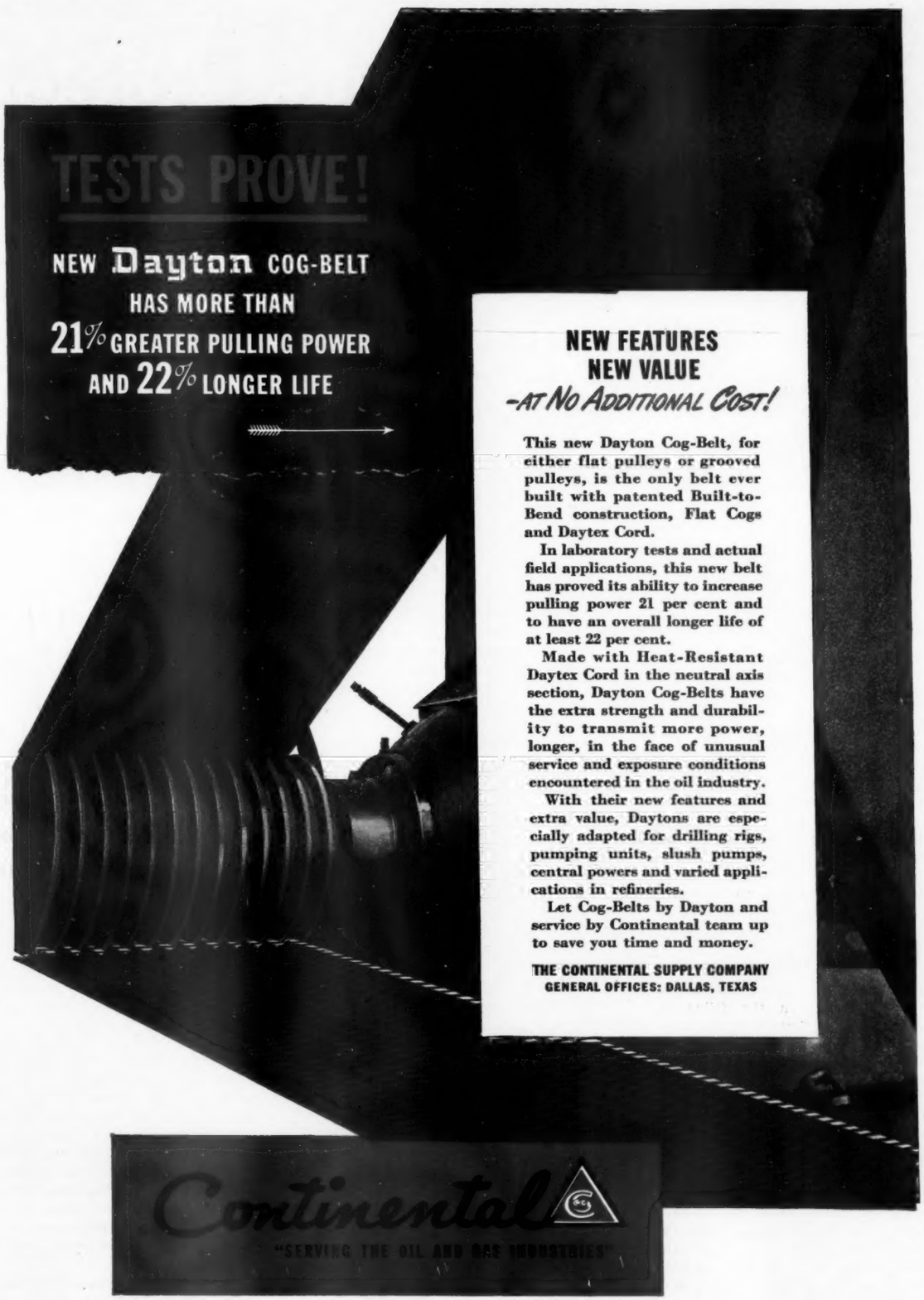
The barge was employed to keep the sag bend from turning sideways and caving in the completed trench. Pipe behind the barge sagged into the trench as the crossing was made. When completely across, the winch on the barge was slacked off and the suspended end sank into place in the trench. Additional strings of pipe were then welded on, for tying into the headers.

On smaller streams and where mud would not permit safe working conditions trestles were used as on the Skunk River in the eastern part of the state. At the point of crossing this river is approximately 100 ft. wide. Specifications called for 150 ft. of level pipe and 300 ft. to be clamped. Pipe was assembled from overbend to overbend, a distance of 420 ft. The weight of the unit, including clamp and coating, was approximately 42 tons. River banks were graded down, and a trestle built across the stream midway between the center lines of the two pipe lines. Working from the trestle, two cranes with clamshell buckets excavated the trench to proper depth. The two cranes and four sideboom-equipped tractors then "walked" the pipe across the trestle and lowered it directly into position in the trench.

A third method was employed where streams were narrow and the ground on each shore solid enough to carry equipment on mats. An example is the West Nodaway River crossing, where two cranes, one on each bank, excavated the channel to the proper depth. The river section of pipe was then carried to the water's edge by tractors where it was picked up and pulled across the water into position by the cranes with the aid of a winch on a flat-rock truck located on the bank opposite the tractors.



Left: Two diesel cranes and tractor start towing and carrying section across stream. Trench acts as skidway. View taken at West Nodaway River, Iowa. Below: Line-up and weld operations. Pipe was welded, five 45-ft. joints to one section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Investigate Abnormal Conditions To Improve Cathodic Protection

By HARRIS WHITE
El Paso Natural Gas Co.

In dealing with an abnormal soil condition a major natural-gas company carried on experiments. It was finally found that satisfactory results could be obtained when the anodes consisted of perforated pipe filled with calcium chloride.

IN August 1939, a 20-volt 150-amp. motor-generator set was installed at the No. 1 gasoline plant of the El Paso Natural Gas Co. at Jal, N. M., in order to protect the plant piping. A thorough survey had been made of the electrical conditions of the pipe, and as a result, 20 separate iron anodes were installed at various locations adjacent to discharge spots and where the pipe-to-soil potential was relatively low. Each iron anode was a section of 16-in. pipe approximately 10 ft. long and buried horizontally at a depth of 6 ft.

After the setup had been in operation for 8 months, long line current and pipe-to-soil readings were again taken to find if adequate protection was being obtained.

It was found that in one section of the plant the pipe-to-soil potential was right at zero or about 200-500 mv. less negative than the rest of the plant piping.

In order to remedy this condition, four carbon anodes were buried vertically in this area and added to the iron anode system already in operation. The test showed that these four carbon grounds took about 22 amp. at the time of installation. However, on a checkup, 2 weeks later, it was found that the pipe-to-soil potential had not risen; and that output of the carbon anodes had dropped to 2.4 amp. Thinking that some sort of back voltage might have been encountered by having iron and carbon together in an anode system, the carbons were removed and replaced by four 80-in. vertical sections of 6-in. iron pipe. Immediately after installation, the four iron anodes took a current of 22 amp., but they dropped their output to 11 amp. after being in operation for 18 hours. The motor-generator set was cut off for around 30 minutes; when it was turned on, the four iron anodes took 14 amp. It was then thought that the heating effect may have increased the contact resistance between the pipe and the soil, so water was poured on the anodes. However, this failed to increase the output.

Six Samples Taken

Six soil samples were then taken from various locations about the plant. In the following tests that were made with these samples, it is necessary to point out that they were performed under field conditions and accuracy that could be obtained in a laboratory was neither attempted nor obtained. These tests were merely efforts to approximate field conditions in order to find some way of preventing the rise in soil resistivity.

Four samples were taken from different locations near the corrosive area, designated Soil A; one from the east side of the plant, Soil B, and one from the west side of the plant, Soil C. The samples were placed in wooden boxes 18 by 13 by 7.5 in. and were filled to within 1½ in. of the top. Carbon elements from dry cells were used as carbon anodes and sections of ¼-in. welding rod were used for iron anodes. Both the carbon and iron test anodes had a surface area of about 3.5 sq. in. Stud bolts 1 by 12 in. were used to represent the plant piping. The following arrangement was given to the tests:

Test No. 1—Two carbon anodes in Soil A.
Test No. 2—Two iron anodes in Soil A.
Test No. 3—Two carbon anodes in Soil B.
Test No. 4—Two iron anodes in Soil C.
Test No. 5—Same as Test 1.
Test No. 6—Same as Test 2.

Six-volt dry cells were used as a source of power, and were connected across potentiometers. The voltages were regulated in each case until the current density on test anodes approximated the current density of the field anodes with an output of 22 amp. The tests were started at 2:30 p.m. May 14, 1940, and were finished at 7 a.m. May 18, 1940. At various intervals, the samples were sprinkled with water to prevent their drying out. This, however, had slight effect, if any, on the current density.

Test of Soil A

A chemist's test of Soil A showed that it contained a good deal of soda ash (Na_2CO_3) and sodium sulfate (Na_2SO_4). Both were due to "blowdowns" of piping in this district; the soda ash being used to treat the gas and the sodium sulfate was from the makeup water. The latter was fairly concentrated, and after tests 1, 2, 5, and 6 had been in operation for about 24 hours, flakes of Na_2SO_4 crystallized out at the top of the test samples.

In order to find if the resistance increase of Soil A was permanent or not, tests 1 and 2 were disconnected after they had been in operation for 27¼ hours. When they were reconnected, if the current picked up to where it had left off at the end of 27¼ hours the resistance increase would have been permanent. A graph of the initial tests showed that the current had dropped off fairly rapidly for the first 9 hours and then continued at a fairly constant value with an occasional slight drop-off. When they were reconnected, after being off for 13 hours, the current was close to the initial current of the first run. Therefore, the resistance increase was seen not to be permanent. However, the current dropped to its constant value much more rapidly than before. This led to the belief that something had been created in the soil by the flow of current that did not totally disappear after a shutdown of 13 hours, or was more easily generated after being subjected to a flow of current once before.

It is known that polarization will have the effect of increasing the resistance of an entire circuit. It is also known that polarization is not a permanent thing and will act as an increased resistance only to currents flowing in one direction. Therefore, if the current was reversed through the tests, if should increase and then drop off as polarization occurred in the opposite direction. If the current did increase, it would be known that polarization, or some phenomenon similar to polarization, was taking place. Therefore, the terminals on tests 5 and 6 were reversed. The current immediately increased, and in several hours had decreased to the value it had reached on the initial test after 20 hours.

Polarization at Cathode

However, polarization should only occur at the cathode (pipe); and in this case there is so much surface to the cathode that it should not materially affect the resistance of the circuit. It should only occur at the cathode because the oxygen liberated at the anode would react with carbon to form carbon dioxide, or with the iron to form oxide of iron. It is known that overvoltage sometimes occurs in an electrolyte surrounding an electrode. Overvoltage is the e.m.f. necessary to overcome the resistance of a chemical reaction at an electrode. Hydrogen overvoltage is the most common and would be the most likely to occur in the case of Soil A. Hydrogen overvoltage is due to a layer of supersaturated, dissolved hydrogen in the electrolyte (the soil in this case) surrounding the electrode.

The problem was then to eliminate the overvoltage effect in the electrolyte. Various chemicals that were known to be depolarizers were added in an attempt to overcome this effect. Among those tried on either test 1, 2, 5, or 6 were sodium chloride, potassium chromate (used to a large extent to prevent cathodic polarization), and concentrated nitric acid. These chemicals aided but slightly, or their aid was not permanent, i.e. they increased the conductivity of the soil, but did not put an end to the overvoltage.

However, excellent results were finally obtained on tests 5 and 6 when calcium chloride was added around the anodes. (The output exceeded the original output of the initial test at all times, and on a whole gave a fairly horizontal curve (current plotted against time). The initial output with the $CaCl_2$ added was 38 per cent greater than the first reading of the initial test in the case of the iron anodes and 11 per cent in the case of the carbon anodes. The final output of the iron anodes with $CaCl_2$ added was 314 per cent greater than before it was added; the final output of the carbon anodes with $CaCl_2$ added was 176 per cent greater than before it was added.

It tests 3 and 4 it was endeavored to create the same situations in Soil B and Soil C that occurred in Soil A. This was only accomplished in part. Soil A was much more conductive than either of the other two. Soda ash was first added to both tests 3 and 4. This had little effect on the conductivity one way or the other. However, when

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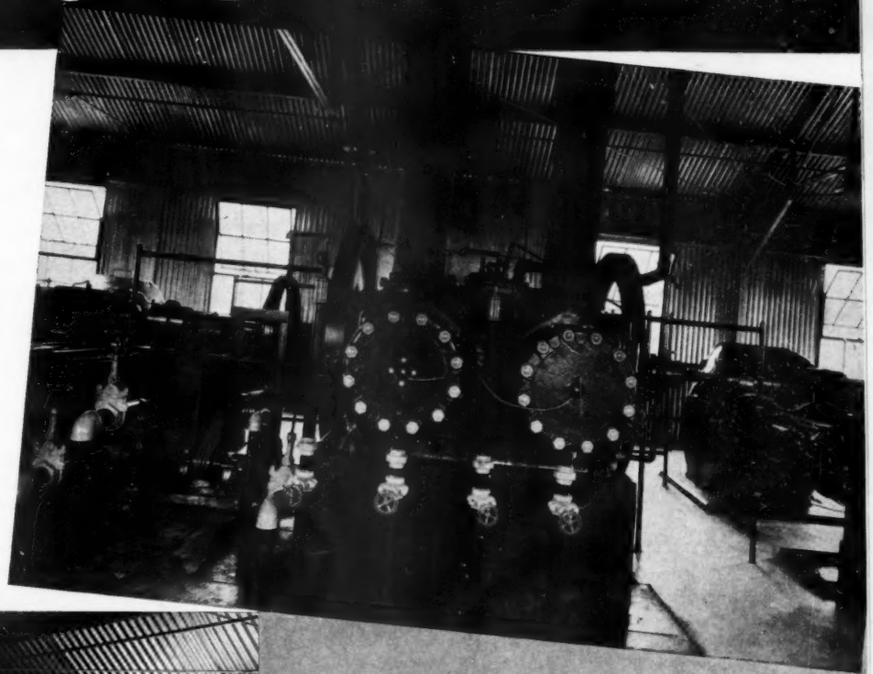

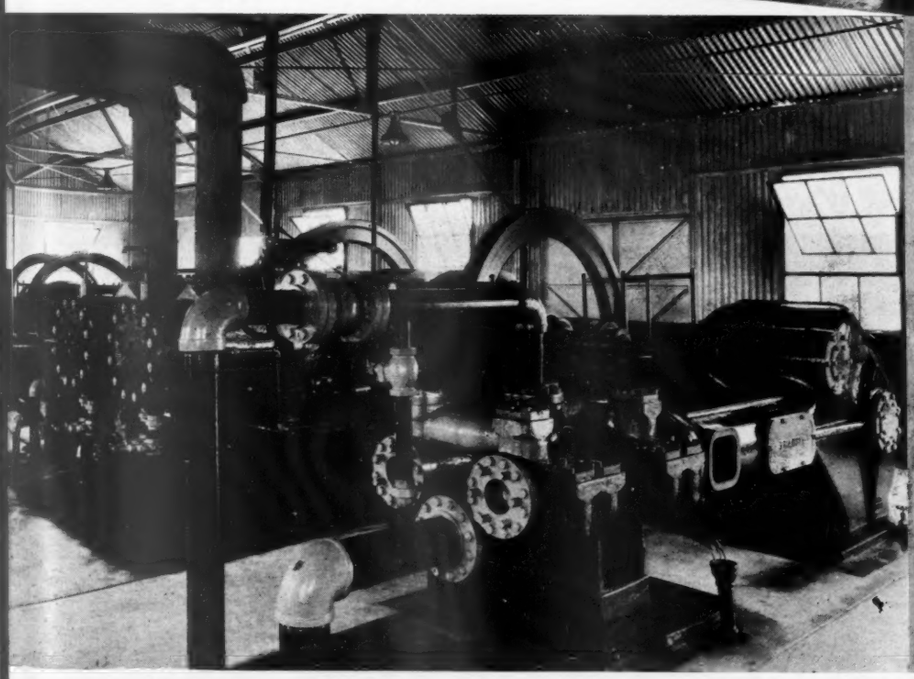

This end view shows how the 160 H. P. Type BT Superior Gas Engine is connected directly to the two main oil pumps. The engine's cooling water pump is driven through V-belts.

The main power unit is a 160 H. P. Type BT Superior Gas Engine driving two reciprocating pumps.

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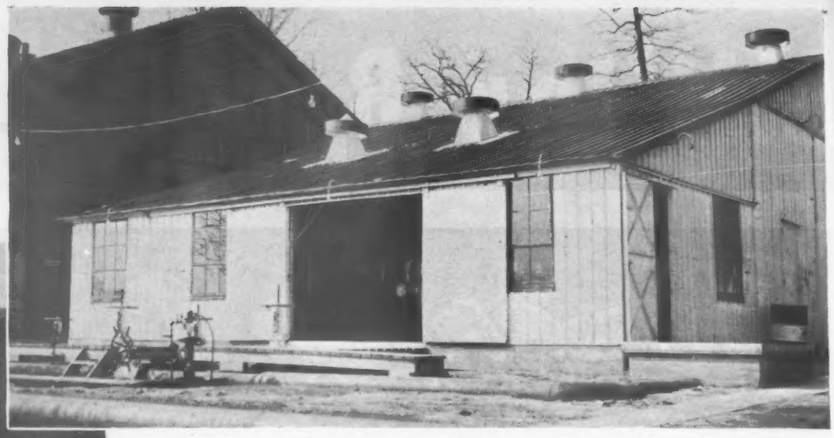

Right: This recently completed station building houses 1,300 hp. of pumping equipment. Note comparison with the adjoining building, which is also shown below, a 34-year-old station building housing 375 hp. of pumping equipment

Old and New Equipment Used on Sohio Line

THE Sohio Pipe Line Co., wholly owned subsidiary of the Standard Oil Co. (Ohio), is the youngest pipe-line company owning and operating a thousand miles or more of main-trunk crude-oil pipe lines.

Formed in 1937 as the Clay City Pipe Line Co., to start the movement of crude oil eastward from Illinois, it has expanded since that time by steady extension of its Illinois system and by several major additions and acquisitions. These have included the purchase in 1939 of about 450 miles of the Tide Water Pipe Co., Ltd.'s 32-year-old 6-in. trunk line from Stoy, Ill., to Warren, Ohio; the building of a 10 and 12-in. line from Salem, Ill., to Lima, Ohio, in 1939 and 1940; and the acquisition late in 1940 of the facilities of the Michigan-Toledo Pipe Line Co., in which the Standard Oil Co. (Ohio) had a majority interest. The accompanying map shows the extent of the system as it is today.

While the methods of pumping crude oil have undergone very few fundamental changes in the last 30 or 40 years compared with changes in other branches of the oil industry, the pumping equipment of Sohio Pipe Line presents interesting comparisons between equipment of a past generation and the present, and between modern installations designed for different conditions.

Pictures Don't Tell Whole Story

The accompanying pictures graphically indicate these comparisons but do not tell the whole story The engines in the old stations weigh over 500 lb. per hp., compared with 120 lb. per hp. for the modern 400-hp. diesels, and compared with about 80 lb. per hp. for the smaller high-speed diesel engines. The flywheel alone of one of the old engines of about 125 hp. weighs more than half a complete 400-hp. unit of recent design.

It should be pointed out, however, that the old units are still fairly economical in the use of fuel and lubricating oil. They are single-cylinder design, typically with a bore of 20 in. and a stroke of 33 in. The fuel is preheated before it is injected into the cylinders so that cylinder pressures are only a fraction of the pressures in modern diesels. However, while these engines use fuel and lubricants with reasonable economy, the problem of keeping them in repair becomes increasingly difficult with each passing year. When such parts as engine frames and cylinder jackets fail occasionaly, apparently because of fatigue, replacement parts are costly. Under present conditions they are almost impossible to obtain.

Hence, while it can be said that these units after 34 years of service are only now approaching the end of their useful life, future operating experience alone can tell what will be the ultimate life of present-day diesels which operate at higher speeds and at pressures which cause much greater stresses in the component parts of the new engines.

In general, the design of pump stations has been indicated by the probable time period of through-

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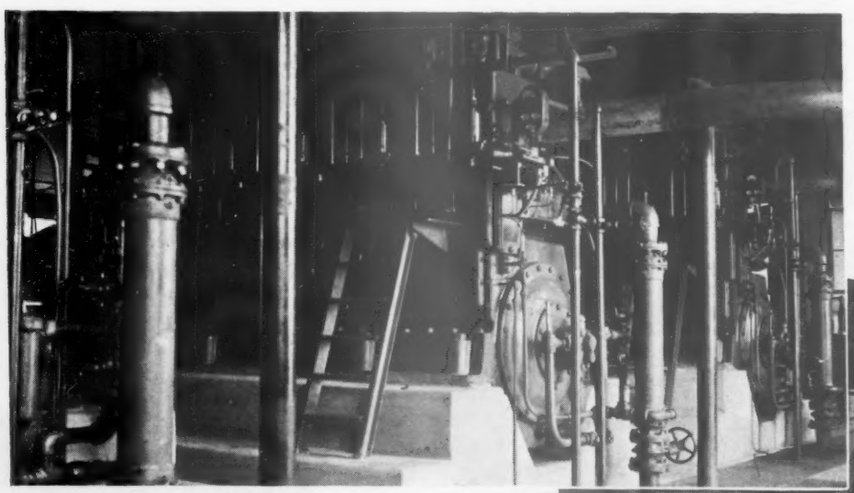
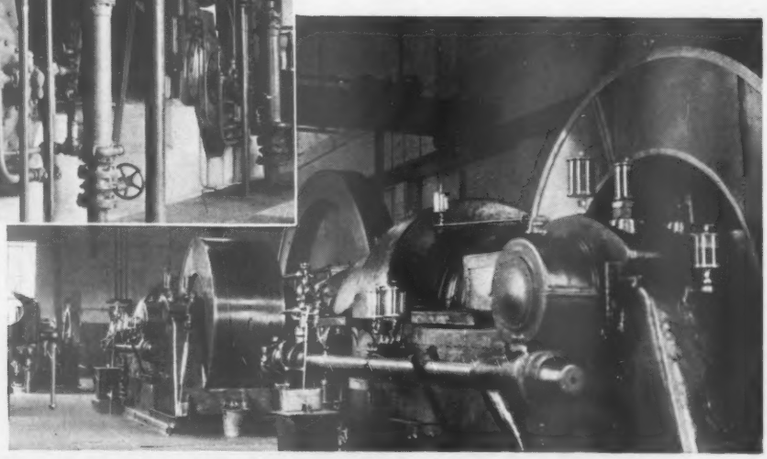
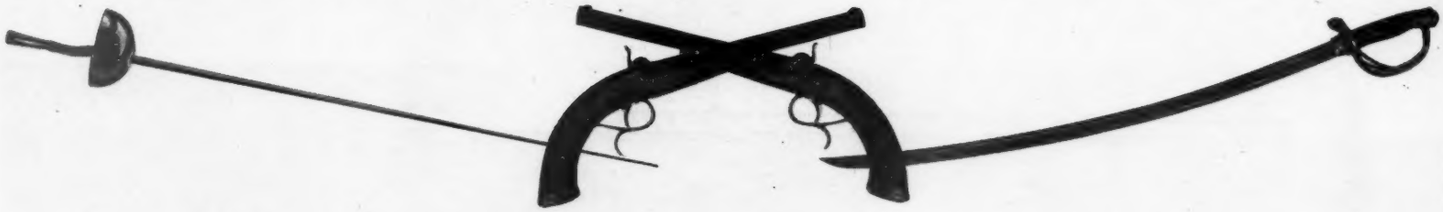


These two modern diesels, occupying a floor space of 970 sq. ft., produce about 800 hp.



These two 34-year-old engines produce about 350 hp. and occupy a floor space of 2,500 sq. ft.



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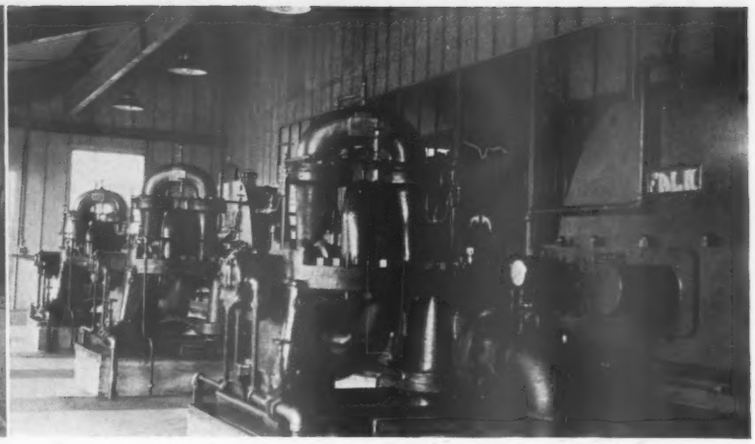


These three 34-year-old plunger pumps, in the picture above left, handle a total capacity of 16,000 bbl. per day. They occupy a floor space of 2,500 sq. ft. In contrast, the centrifugal pumps at right above, operating in series, handle 60,000 bbl. of crude oil per day in a floor space of 880 sq. ft.

put at a given point. Stations which might have to be relocated because of changes in volume generally employ units which do not require heavy foundations and which can be moved with small expense. Electric motors with centrifugal pumps generally are employed for such temporary installations wherever reasonable power rates prevail. However, if such electricity is not available, then high-speed diesel engines of from 80 to 120 hp. are employed to drive piston pumps in parallel. As many as 14 such units have been operated at a single station in this manner.

Centrifugal Pumps

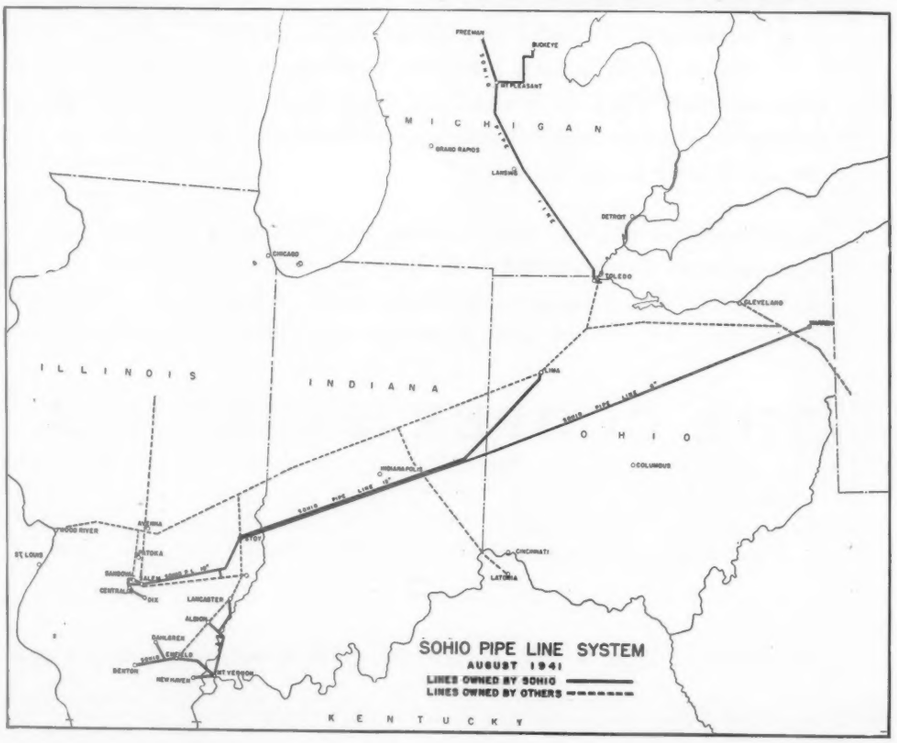
On the 240-mile 12-in. section of the line between Stoy, Ill., and Lima, Ohio, slow-speed diesels of 350 to 450 hp., driving centrifugal pumps through speed increasers, have been employed at main stations and supplemented at other stations with electric motors and high-speed diesel units. This section of the line is one of the highest-capacity crosscountry single crude lines in operation in the pipe-line industry. Upon completion of the current additions which are being made to meet the requirements of the national-defense emergency, this section will transport over 3,000 bbl. per hour for the entire length, or somewhat over 25,000,000 bbl. per year.

W. T. Holliday, president of the Standard Oil Co. (Ohio), is president of the Sohio Pipe Line Co. Sidney A. Swensrud, vice president of the parent company, is vice president and general operating head of the pipe-line company. E. F. Morrill is chief engineer of Sohio Pipe Line Co.

S. H. Elliott is vice president and manager of pipe-line operations; J. Frank Wilson is vice president in charge of Illinois and Indiana operations with headquarters in Mount Vernon, Ill.

Frank Vogler is superintendent of the Illinois-Indiana system with headquarters at Mount Vernon; Frank A. Smith is superintendent in charge of the Indiana-Ohio system with headquarters at Brooklyn, Ind.; Maurie W. Walters is superintendent of the Michigan-Toledo system with headquarters at Mount Pleasant, Mich.

Executive offices of the company are located in the Midland Building, Cleveland, Ohio.



Investigate Abnormal Conditions To Improve Cathodic Protection

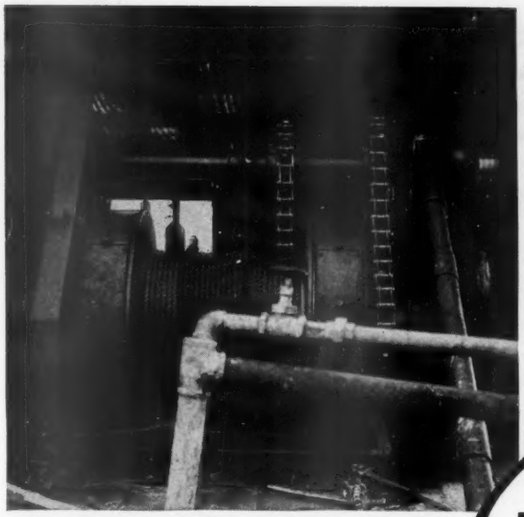
(Continued from Page 106)

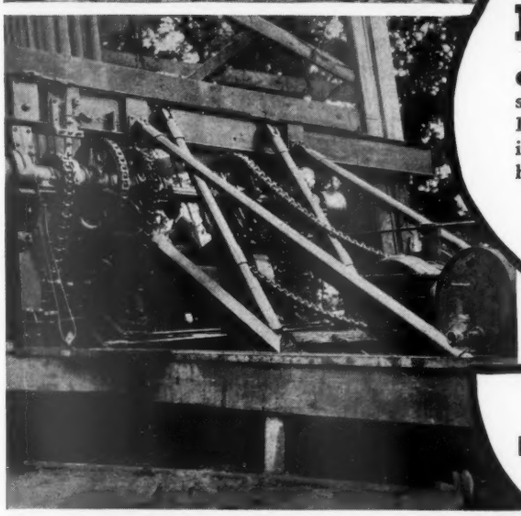
the sodium sulfate was added, the output doubled. This explained why the resistance of Soil A was so much lower than Soils B and C. Nothing was ever added, however, that would make the resistance of the soil increase with the flow of current. The actual conditions that caused the overvoltage at the anode had not been hit upon at the time of this writing.

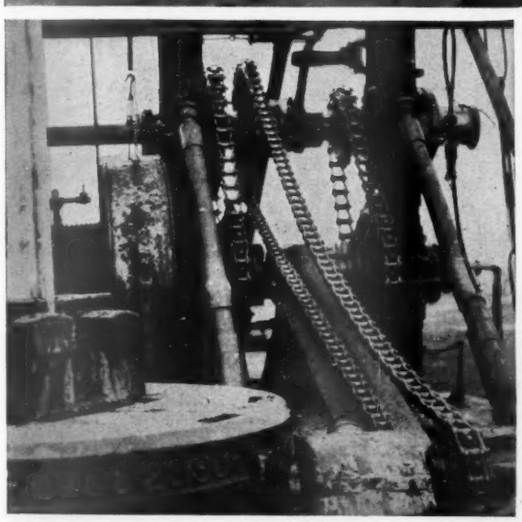
Some difficulty occurred in applying the $CaCl_2$ to the field conditions. In the extended anode system used, the anodes were installed closer to the piping than is generally done in a cathodic protection installation as applied to a pipe line. In fact, the four anodes in Soil A were to protect about 1,000 sq. ft.; and the anodes were in some cases as close as 20 ft. to the piping. It was feared that the use of $CaCl_2$ might depolarize the cathode as well as eliminate the overvoltage from the soil surrounding the anode because of the proximity of the anode and cathode.

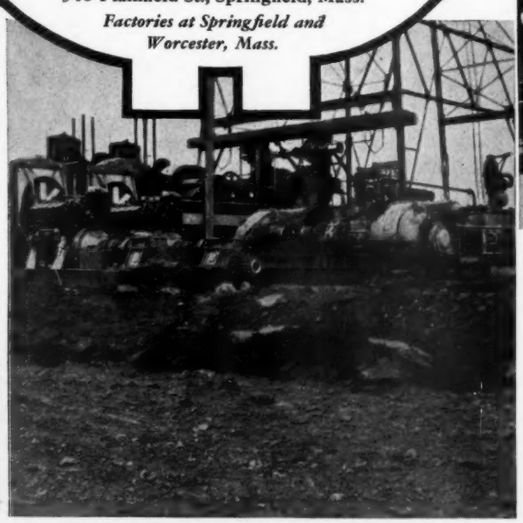
It was for this reason that perforated iron anodes were finally used in the field installation. Twelve-foot sections of 6-in. pipe were buried horizontally so that about 6 in. extended above the ground level. One-half-inch holes had been drilled in the pipe; four to a circumference, and located laterally at about every 8 in. The interior of the pipe was filled with solid $CaCl_2$. Water was poured on top and as the $CaCl_2$ dissolved it filtered out into the soil surrounding the pipe. In this way the $CaCl_2$ could be confined to the area surrounding the anodes and offered a way in which more $CaCl_2$ could be added as time demanded.

This method of increasing the pipe-to-soil potential has proved very satisfactory in this particular area. However, it is not presented as a cure-all for all abnormal soil-condition problems. It is merely a review of another one of the interesting problems that confronts the corrosion engineer day by day.









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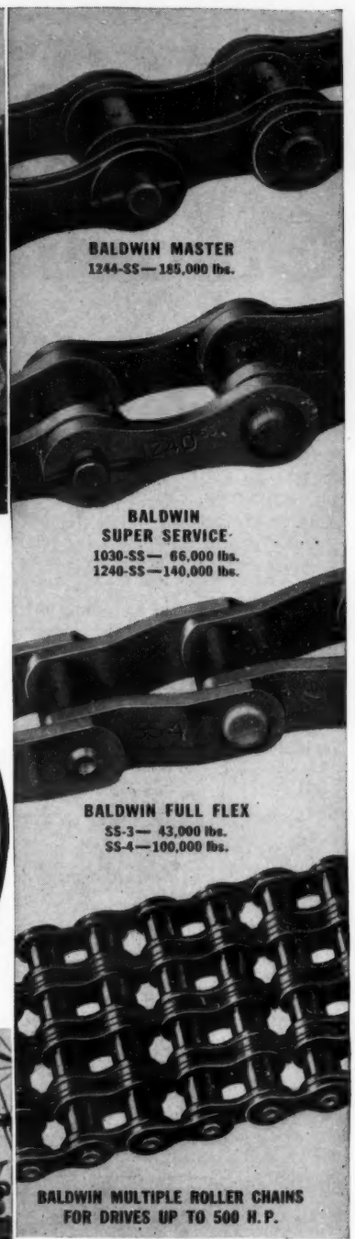

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Graphic Corrosion-Leak Record Guides Pipe-Line Protection

By RALPH WARDWELL
Chief Pipe-Line Engineer, General Petroleum Corp.

FOR 5 years the pipe-line department of General Petroleum Corp. has kept a graphic record of corrosion leaks on all lines. Occurrence of leaks is plotted in a manner that furnishes a day-to-day analysis of corrosion progress. Coupled with field-inspection data, the leak charts supply the basis for determining which section of line should be protected against corrosion.

Conditions under which the pipe-line system of General Petroleum Corp. must be maintained range from the highly industrialized sections of Los Angeles to the arid region about Kettleman Hills. In between these two extremes is valuable farming land and mountainous topography. Any method of record keeping or control applied to such a system must be administered with flexibility, taking into account the local right-of-way conditions.

Since the leak charts are part of a broader system of control, General Petroleum Corp.'s office routine for the recording of leaks will first be set forth:

When a leak is first reported it is entered in a book which carries all leaks over the entire pipe-line system in chronological order. Subsequently this report is enlarged to include the location, type of leak, amount of oil lost, method of repair, materials used, cost of repair and cost of leak. The entries for each month are separated so that the total oil loss and other similar items can be obtained readily on a monthly basis.

A second set of record books lists all leaks according to lines or gathering districts in chronological order, carrying the same data as above but adding all other information pertaining to the line. A book of this series gives the entire history of one pipe-line throughout its life.

Location Charts

Corrosion leaks entered in the record books are also plotted on large-scale charts which show accurately where each leak occurred. For want of a better name these charts will be designated as "location" charts. The date at which each leak occurred is noted at the location, while other notes and symbols show what sections have been coated, the type of coating used, and when it was applied. The location chart is not a map but a continuous record of leaks and the application of coating along the line. Enough features on the right-of-way, such as railroad tracks, highways, canals and station numbers are indicated so that all leaks can be plotted accurately. On cross-country lines the telephone poles are numbered, and the locations of leaks are determined by these poles.

The location charts also show all insulating flanges and their dates of installation. The insulating flanges are used wherever there is a change in soil conditions, and also to terminate the segments of the line on which cathodic protection is used. When there is a soil change on the right-of-way, the flow of electricity in the line is always from the light soil to the heavy soil, which results in rapid corrosion of the line in the heavy soil. Accurate leak charts call attention to this corrosion where the difference in soil conditions may have been overlooked. Also, if an insulating flange should be faulty, leak charts would usually give the first indication of this fact.

RALPH WARDWELL

The scale used for location charts varies widely, usually being about 400 ft. to the inch on town lines and 1,000 ft. to the inch on pole lines.

Time Charts

The final form in which leaks are recorded is known as the time chart. It is made on a small scale, usually 5,000 ft. to the inch, so that each covers a long segment of line, as shown by the example, Fig. 1. The abscissa represents the location of the leak, while the ordinate denotes the time of failure. The example shown is an actual record of a line that has been in use for many years. It shows how the corrosion leaks over a period of years have been localized in certain places, while there is one 4-mile stretch that has had no leaks to date. The horizontal lines represent coating which was applied after the chart showed a concentration of leaks in these sections. For details about coating or leaks the operator refers back to the location charts.

After the time charts have been kept up to date for a number of years, it becomes possible to anticipate the future occurrences of leaks to some extent so that measures can be taken to avoid them. By clearly defining the troublesome portions of the line, the charts make it economically feasible to undertake even the most elaborate methods for determining the causes of corrosion. If only limited sections of the line are to be dealt with, soil tests can be made, the line can be uncovered for inspection, and other measures can be taken that would prove too costly if they had to be administered over the entire length of right-of-way.

Using the time charts, only the sections of the lines where trouble is occurring are coated or otherwise protected. In this way the expense of coating portions of the line where there is no trouble is deferred until leaks begin to occur. In Fig. 1 it is seen that the section of line in the neighborhood of Station 240+00 has not been

(Continued on Page 120)

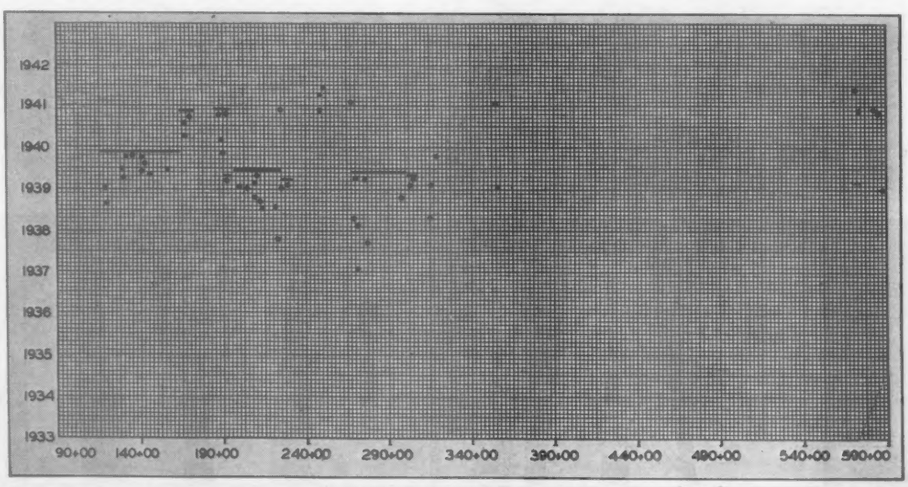
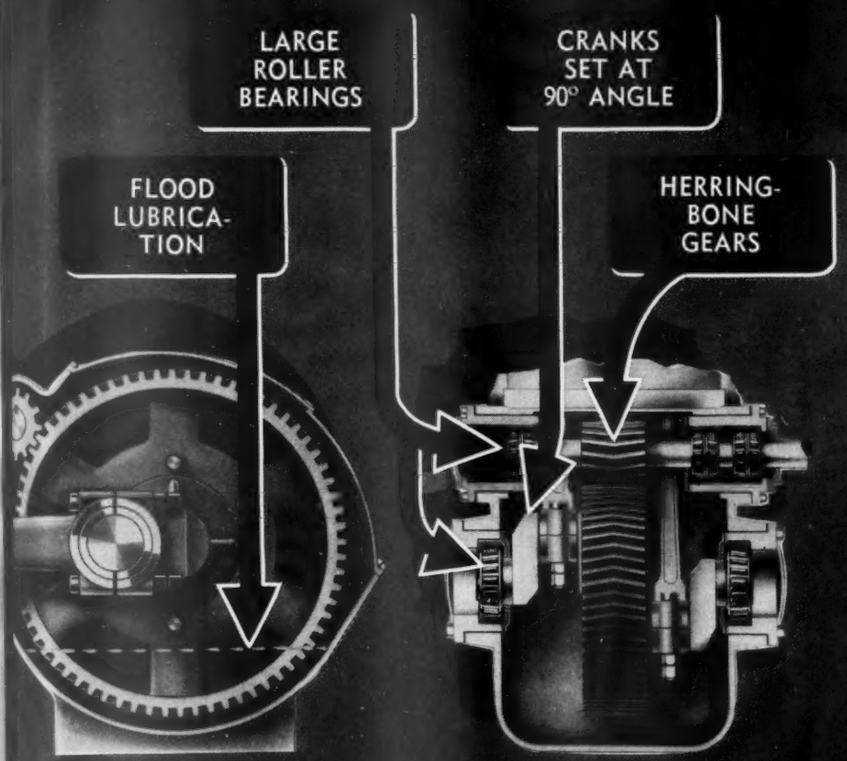


Fig. 1—Time chart for analyzing occurrence of corrosion leaks on a segment of pipe line. Horizontal lines represent coating which was applied after the troublesome sections had been defined over a period of several years

MEN PICK GASO



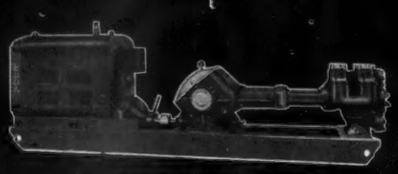


Fig. 2050-S. Portable Unit. 59 bbls. at 1000 lbs. to 255 bbls. at 250 lbs.

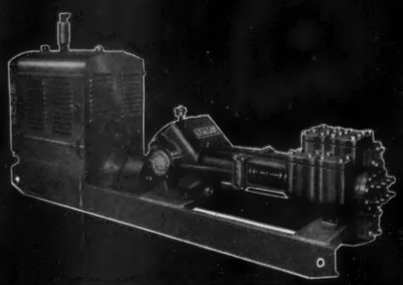


Fig. 2249. Also mounted on trailer. 46 bbls. at 750 lbs. to 126 bbls. at 300 lbs.

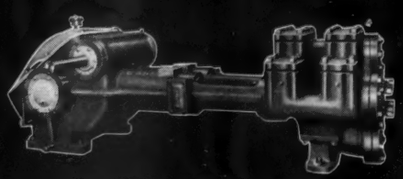


Fig. 1550. 59 bbls. at 1000 lbs. to 255 bbls. at 300 lbs.

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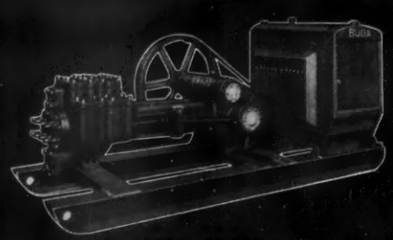

Fig. 1849. 46 bbls. at 900 lbs. to 126 bbls. at 350 lbs.

Fig. 301. Piston Power Pump. 24 to 30-inch stroke. 31.73 to 157.36 bbls. per hour.

PUMPS

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coated. Leaks are now beginning to occur in this section, indicating that it will be coated in the near future. It may be argued that if this portion had been coated at the time the segments to the north and south were treated the leaks would not have occurred. But on the other hand, a large expenditure would have been made 18 months before there was any indication that it would ever be necessary. In maintenance work it is considered good economy to delay making an investment until it is really needed.

Without field investigation the corrosion analysis charts would have little value. Their office should be that of directing field study. Several times they have called attention to a number of leaks occurring within a 10-ft. interval over a period of years. Field investigation has then disclosed an unsuspected source of trouble that could easily be overcome once attention had been called to it. In one case refuse discharged infrequently from a plant ran down a creek bed in which a line was buried. As soon as a concentration of leaks on the time chart brought about a field investigation, the line was raised up out of the creek bed to avoid further trouble.

When two pipe lines occupy the same right-of-way, the practice has been to plot their time charts side by side for the sake of quick comparison. If there were any definite relationship between the corrosion which takes place on two parallel lines, a composite chart of this type would be of great value. However, the new line usually corrodes away first, protecting the older line which acts as the negative electrode. In one case the newer line was coated after it had given trouble due to corrosion leaks. Five years then elapsed before leaks developed on the older line, indicating that no appreciable corrosion had taken place on the old line while the newer line was bare. When trouble did start on the old line, the corrosion analysis charts for the parallel line were useful in defining the troublesome localities.

General Petroleum Corp.'s practice in protecting pipe lines calls for use of the best available coating in the thickly populated districts of the Los Angeles Basin, but cheaper coating is often used in the San Joaquin Valley because rainfall seldom penetrates to pipe-line depths, there is less industrial refuse, less danger is caused by leaks, and less expense is involved in repairing leaks.

Using time charts to define corrosive areas, as little as 40 or 50 ft. is sometimes coated. In one instance a line crossed a wash 10 times within 1 mile, and the charts showed leaks developing at each crossing. The most economical method of protecting the line against the periodic salt flows in the wash was to coat 50 to 100 ft. of line at each crossing. Ordinarily, however, it is considered unwise to leave an interval of less than 1,000 ft. between two coatings unless the reasons for the corrosion are clearly understood and defined.

Cathodic protection is used in areas where it is known that no lines belonging to other companies exist which might be adversely affected by the flow of current.

In the routine repair of leaks, electric welding is used everywhere except in tank farms.

Conclusion

It has been found that by clearly defining the troublesome segments of a pipe-line system, the leak charts make it economically possible to carry out more intensive investigation and remedial work, since no effort is wasted on line that needs no attention. Some other form of recording leaks might serve equally as well as the system described above, provided that it called attention to the relationship of leaks to one another and clearly indicated the time element. The system here described was worked out by F. D. Posey, who was chief pipe-line engineer for General Petroleum Corp. until his retirement in January.

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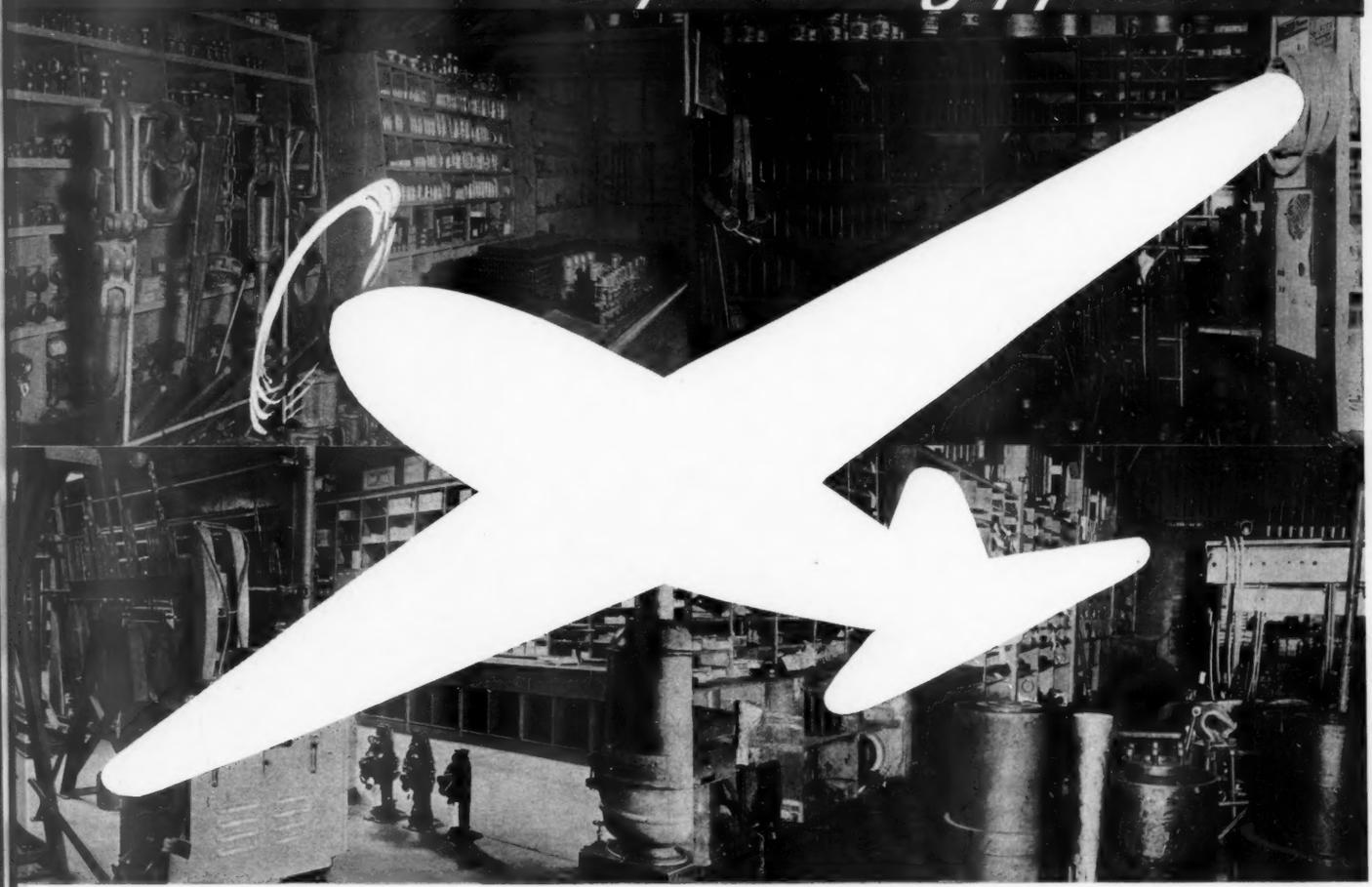

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Location of Leaks in Gasoline Pipe Lines Presents Problems

PIPE-LINE operators have for years visualized a leak locator installed at upstream pump stations that at a glance would indicate the existence of a leak and its location to the nearest foot, something that would do hydraulically what the wheatstone bridge does electrically for communication engineers. Since hydraulic circuits cannot be calculated with the exactitude of electric circuits, because certain factors not encountered in the electric calculations materially enter into the hydraulic figures, there is no comparison between the leak-testing methods applied.

In crude-oil pipe lines, leaks quickly disclose their presence to line walkers by coming to the top of the surface. Water has this same characteristic, only much more so than crude oil. The property of these two liquids to seal porous soils and eventually form a leak-obstructing cavity under the line that diverts the pressured liquid upwards gives them the advantage of indicating a leak point faster than any other method. With this relatively easy system of discovery, the incentive to study or devise equipment for locating leaks did not exist, and it was not until finished-product pipe lines made their appearance that leak location became a matter of genuine concern to these operators.

The reliability and power of observation of the line walkers on the product lines was just as high as their counterparts on the older crude lines; yet, leaks were consistently passed that were known to exist because pressure drops and downstream station shortages indicated such a condition. Because finished products and particularly gasoline do not coagulate porous soils, the probability of finding leaks in terrain where the pipe cover is dense clay, with an underlying ditch of loose material such as sand, is remote and a leak often runs for weeks without being discovered.

In order to analyze the procedure followed when a leak is being sought on a gasoline line, it may be well to consider the facts present when the existence of a leak somewhere on a line section is suspected. The simplest instance is the one wherein a line walker, other company employe, landowner, tenant or other individual reports the presence of gasoline on or near the right-of-way. This leak is fixed without further ado. If a persistent gage shortage is present between two stations which cannot be accounted for by tank switches, strainer choking, pumping a tank to air or any other operating procedure apt to produce a faulty capacity gage, a leak is present. Likewise, if a sudden pressure drop during normal operation is compensated for by a unit speed up to maintain normal pressure, a leak can be suspected. To test, the line is shut down and the upstream station of the section builds pressure to 300 lb. per sq. in. If this pressure fails to hold, the presence of a leak is definite. One word of caution is pertinent here. In building dead pressure on a line, it is, of course, absolutely essential that the valves at each end do not leak. It is often necessary to drop a blind gasket into the line at the end so that it can be safely assumed that the pressure is due to a leak and not a faulty valve.

Usual Procedure

With the pressure of a leak, proved as above, the usual procedure is to augment the corps of line walkers with sufficient other men so that the section can be covered quickly and without delay. In approximately 90 per cent of the instances, the leak is soon discovered and a repair made. It is the remaining 10 per cent defying detection by visual inspection that must be found by other means.

Nature very often presents the answer to leak locations if the season happens to be that when tree, shrub and ground foliage are on their best display. Leaking petroleum usually kills off this vegetation and the darkened scar points like an accusing finger at the handiwork of man. Observant line walkers quickly investigate the soil condition around vegetation that has suddenly dried up. Leaks sometimes even have a comic angle as evidenced by the fulminations of an irate farmer whose ducks suddenly began to parade in the nude. A gasoline leak, at considerable distance from the farmr's home, followed a tile drain to the duck pound and caused consternation amongst his domestic brood.

Leaks that defy detection by visual observation, while not numerous, may usually run for weeks or even months, and other methods must be used to locate them. It is with these leaks that this article is primarily concerned and a general description of the schemes used to finally locate them may prove interesting. An accurate profile, run with an engineer's level, of the section of line in question is absolutely essential for analysis of hydraulic static heads. A chart is prepared which shows the elevation of the highest point between the stations themselves and locations on the line where a pressure gage can be installed. These points are usually the gate valves spaced at regular intervals on the line. By subtracting each of these elevations from that of the high point, and with a knowledge of the gravity of the product in the line, it is a simple matter to calculate the hydraulic head present at each point when the line is full. For example, if the high point on a line full of gasoline having an A.P.I. gravity of 63° is at 1,000-ft. elevation, and one of the test points is at 860 ft., the pressure to be expected at this test point would be 44 lb. per sq. in. The calculations can be made for the entire pipe-line system and be available at all times.

When a leak exists, accurate pressure gages, preferably of the inspector's test variety, are inserted at the two end pump stations of the section. One of these gages will give a lower reading than the one calculated above when the line is full. Of course, in case more than one leak is present the gages at both ends of the line can read lower than normal. There is also the possibility of a leak in which the line can hold full hill pressure but leakage will occur when this figure is raised. In two such instances, the leaks have been due to split welds in manifold wyes which opened when hill pressure was exceeded. Such fittings should be checked when hill pressure heads at the station ends are normal and yet a leak is known to exist.

In the overwhelming majority of cases it will be found that the pressure at one end station is practically as calculated, while the other is low. All the line between the high point and that station showing normal hill pressures can be eliminated, and work concentrated on the remainder. If the high point is close to a station showing normal hill pressure, very little line is eliminated, but often about one-half of the line or more is known to be sound as a result of the gage readings. The reading at the station showing a par-

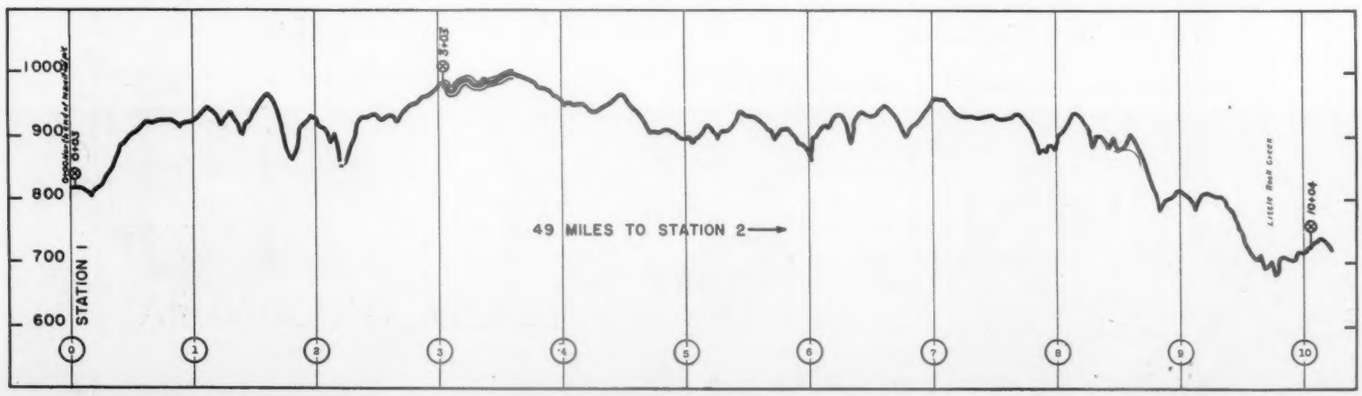
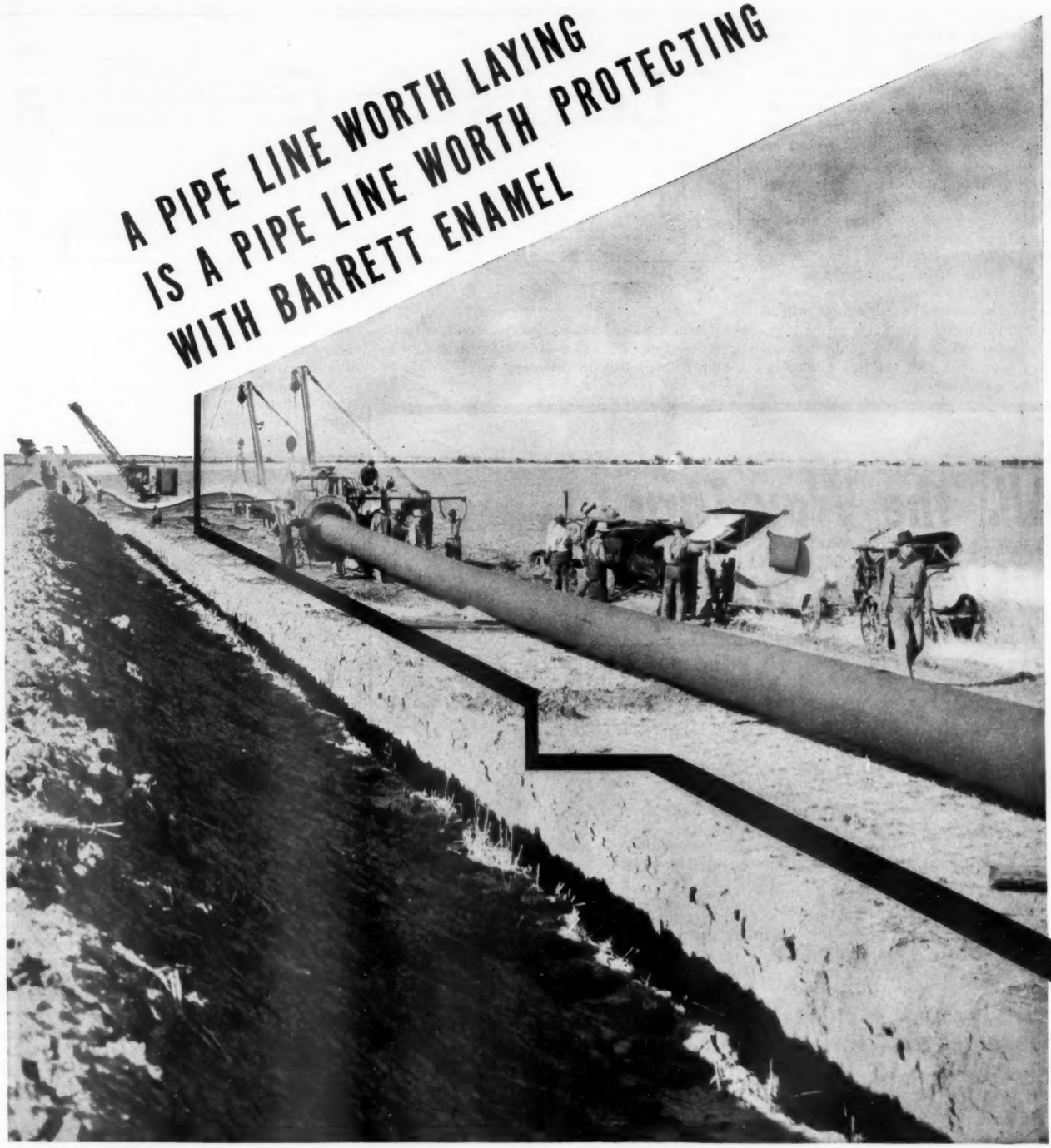


Fig. 1

A PIPE LINE WORTH LAYING IS A PIPE LINE WORTH PROTECTING WITH BARRETT ENAMEL



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tially full line will give some indication of the location of the leak. For example, if the calculated gage is 50 lb. per sq. in. and the actual reading is 30 lb. per sq. in., it is obvious that a leak exists at an elevation sufficiently high to produce 30 lb. per sq. in. at the station, or when pumping gasoline at an elevation 95 ft. above that of the station. Theoretically, all that would be necessary would be to pick such points from the profile and dig them up. Due to profile vagaries, such a procedure is not tenable and more checks should be made. A pressure-gage measurement is now made at all the accessible points on the section where the leak is known to be. These serve as checks on the initial readings and narrow down the exact elevation of the leak. It is quite possible that a reading can be obtained at the station which is of value only in showing which side of the high point the leak exists. For example, if the terrain of the country were such that the line gradually rose after leaving the station to a rather high point, then dipped into a deep valley and rose to a high point, a leak in this deep valley would be revealed at the station only as a pressure drop caused by the difference in elevation of the two hills and not the valley versus station. For this reason, more checks are necessary. Likewise, if large sections of the line are relatively flat, the isolation of the leak into such a flat may still mean several miles of pipe as the leak elevation. For these reasons, it is seldom possible to find a leak accurately from pressure-gage readings alone, but it is possible to eliminate much of the line and check the remainder with some form of apparatus adapted to this work.

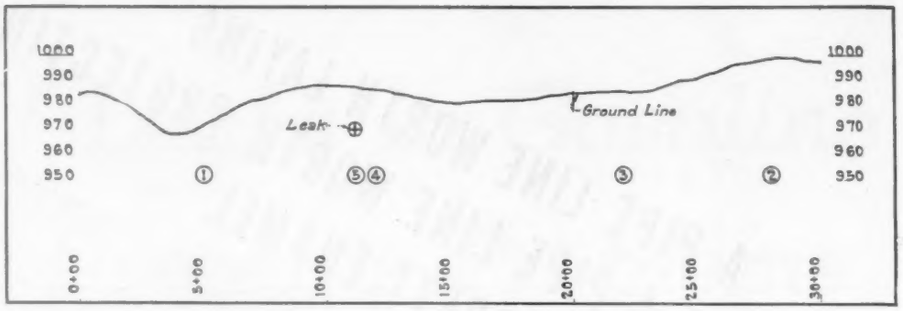

Figure 2

Two Types of Detectors

Leak detectors for gasoline-pipe-line work are of two types. The first is a device in which a sample of gas from pipe depth is analyzed for explosive characteristics. It is a more sensitive instrument than that commonly used around refineries. The main disadvantage is the necessity for making tests very close together since the gasoline escaping from the line often does not travel any appreciable distance along the pipe. The advantage of the instrument is relative speed of tests and the fact that an experienced operator need not run them as the device is nearly foolproof. A hollow prod is inserted to pipe depth and a sample of the vapor present is drawn into the instrument. Measurement is then made on the explosive characteristics of the vapor.

The other type of detector has for its basis two fundamental physical facts. The first is that vibrations propagated through a solid medium break up into two types of waves ultimately assuming longitudinal and transverse characters. Second, the attenuation rate of waves propagated through solids varies with the frequency. The vibrations originating at the leak represent an energy in the form of waves which have been generated by the pounding of the liquid molecules against the walls of the leak hole. The velocity of escape is determined by the pressure differential through the leak. The leak vibrations vary directly as the mass of fluid molecules, and directly with the square of the pressure.

The distance at which a leak can be picked up depends upon numerous factors including pipe size, type of soil, size of leak and pressure. At the maximum operating distance from the leak only the low-frequency vibrations are present. These gradually increase in pitch as the leak is approached. It is usually possible to find the leak by the use of head phones and pick up audible noise by using a selective filter which keeps out extraneous sounds. The plotting of the curves showing transverse and longitudinal wave propagation is seldom necessary, and then only in the case of extremely small leaks of the "sweat" variety.

A combination of all the methods discussed was recently used to locate a leak that existed for 3 weeks and had defied detection by the usual line-inspection methods. A section of the profile of the line involved is introduced as Fig. 1 to demonstrate the manner in which the leak was eventually isolated to cover a relatively short distance. Fig. 2 shows this isolated section drawn

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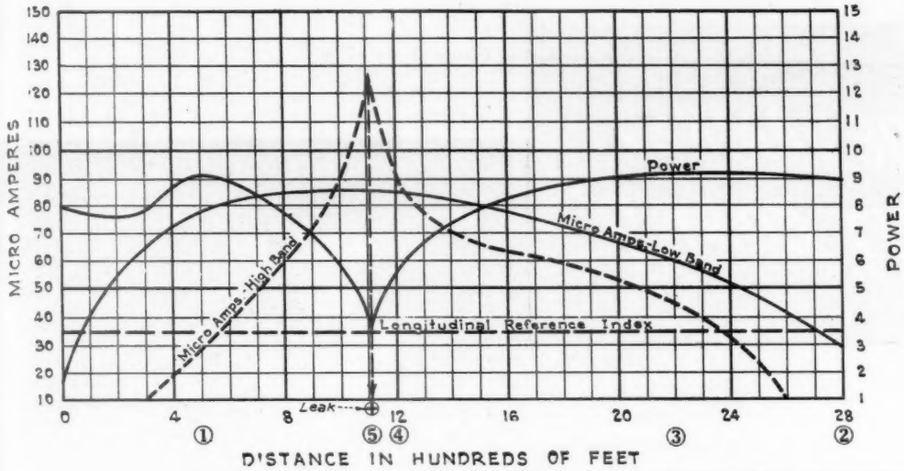

Fig. 3

to a much finer scale than Fig. 1. The ringed numbers on Fig. 2 coincide with those shown on the compound curve, Fig. 3, which is illustrated graphically in this instance, for clarity of explanation. To return to the original problem, namely, to find a leak known to exist in the section between station No. 1 and station No. 2, a distance of approximately 49 miles. It was fortunate that an accurate profile was availavle and gate valves located at strategic points along this profile provided excellent connection points for inspectors' pressure gages. A table with appropriate captions was used to record gage readings and other data.

To eliminate the possibility of misleading pressure-gage indications usually caused by leaky endgate valves, blind gaskets were installed at the upstream and downstream ends of the section and the pressure was permitted to stabilize before proceeding with gage tests.

Conclusions Drawn

Inspection of column No. 4 in the tabulation showed that the normal hill pressure was nonexistent at gate Nos. 1 and 2 whereas the pressure head on gate No. 3 at M.P. 10+04 was all right. It was therefore logical to conclude that the line was not leaking between M.P. 3+3140 and M.P. 10+0400. The head of 168 ft. on gate No. 1 projected upwards from this point showed the line to be full of liquid up to M.P. 3+1160 on the coarse profile map, Fig. 1, or 10+00 on Fig. 2. The remaining distance between 10+00 and 30+00 was an unknown quantity but since it was only 2,000 ft. long exploration was not difficult with a wooden pipe finder and proper probing bars.

After deciding that the leak existed in the 2,000-ft. section, normal pumping was resumed in order to produce the sound and subsequent vibrations from which intensity measurements could be taken. The first test hole was bored at 5+00, Fig. 2. It is tabulated as (1) to coincide with a similar number on Fig. 3. An explanation of the several curves in Fig. 3 should be appropriate before proceeding. The instrument used is a sensitive sound amplifier with pickup tubes that contact with the pipe. A hermetically sealed element in the end of the pickup tube resonates in harmony with certain frequencies of the vibrations set up by the escaping liquid. Two pickups are ordinarily used, one for low-frequency measurement and the other for frequencies in the medium and high ranges. The low-frequency pickup tube simply establishes the existence of a leak in the immediate vicinity of the setting point. If there is no leak the microammeter indication is so small that it is discounted.

The medium and high-frequency pickup tube is for location work after it has been definitely established by the low-frequency indications that a leak exists. While head phones are part of the equipment they are not absolutely essential because the vibrating frequency and its intensity can be measured in microamps.

To return to the job of locating the leak in the suspected 2,000 ft., the first setting was made at (1), Fig. 2, and frequencies of 78 in the low band and 29 in the high band were noted. A tabulation of subsequent readings from which the compound curve, Fig. 3, was prepared is as listed.

A characteristic of all fluids leaking from pipe lines under pressure is that while low-band transverse frequencies may be detected for relatively long distances, high-band transverse frequencies are quickly attenuated. Inspection of the above chart verifies this where, for example, at location No. 2, 1,680 ft. from the leak, no measurable high-band frequencies exist, whereas at location No. 4, 80 ft. from the leak, the high-band frequency has climbed to 91, and at the leak it reaches its zenith

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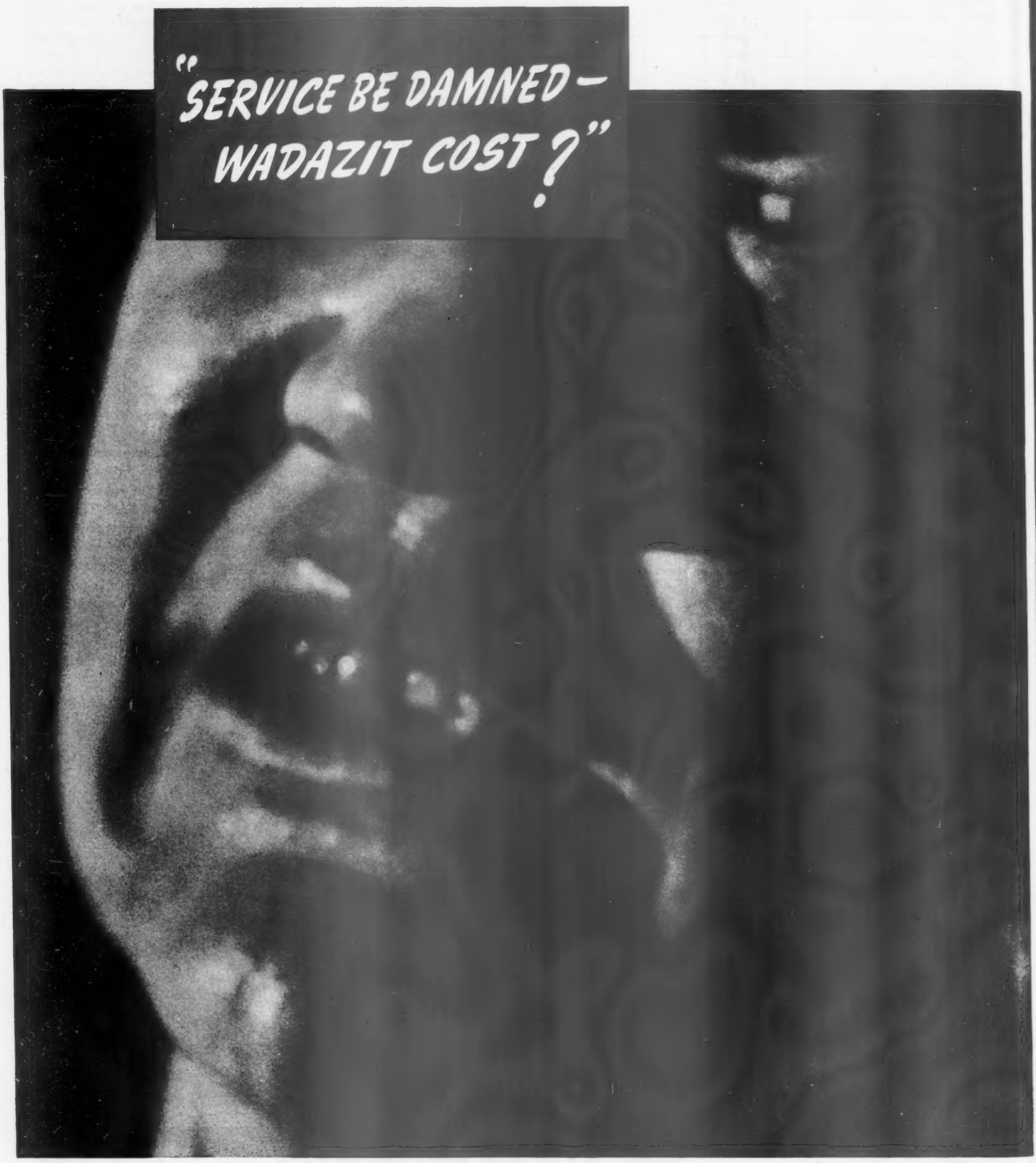

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PRESSURE-GAGE RECORD

(1) Gate No.	(2) Gas, sp. gr.	(3) Normal hill pressure (lb./sq. in.)	(4) Actual hill pressure (lb./sq. in.)	(5) Height above gate where (4) exists (ft.)	(6) Location of (5) on profile
1	0.73	57	53	168	M.P.3+1160
2	0.73	4.75	None apparent	None	None
3	0.73	85.4	85.4	270	M.P.3+3140

MICROAMMETER INDICATIONS

Location—	Power	Longitudinal reference	Microamps— Low band	Microamps— High band	Distance to leak (ft.)
1	9.1	35	78	29	620
2	9.0	35	30	..	1,680
3	9.1	35	60	44	1,080
4	5.6	35	85	91	80
5	3.6	35	87	126	0

of 126. It is also evident that as the high and low-band frequencies increase the power decreases, an indication in itself that the leak point was close by since it required less power to amplify the vibration caused by the escaping liquid. In this instance, the leak was located where the high and low frequencies were greatest and the power was least. A combustion indicator used to check the results showed that the leak could be bracketed in a 30-ft. strip.

The hole in the pipe was approximately ⅛ in. in diameter and it was located on the bottom. The product loss exceeded 1,000 bbl. The encouraging feature about the whole procedure was that 1 hour after the first test for leak vibrations was made in the isolated section the leak was found.

In conclusion, while it is conceivable that leaks may occur in terrain that indicates several locations as the possible source when viewed from a static head angle, yet it is logical to assume the combination of methods herein described will shorten up the sections to be inspected to less than 10 per cent of the total distance. Of course, working leaks that open up only under pressure considerably in excess of the static heads will always present a problem but since these invariably occur in branch and tee wye welded connections inspection should get close attention.

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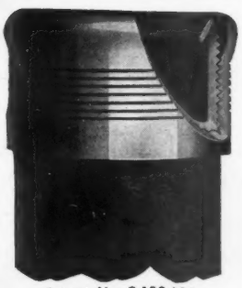

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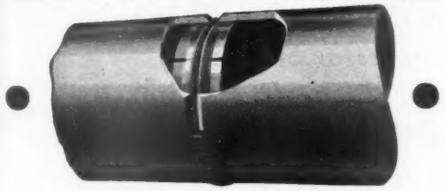

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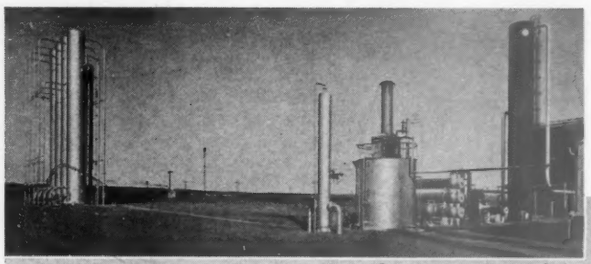
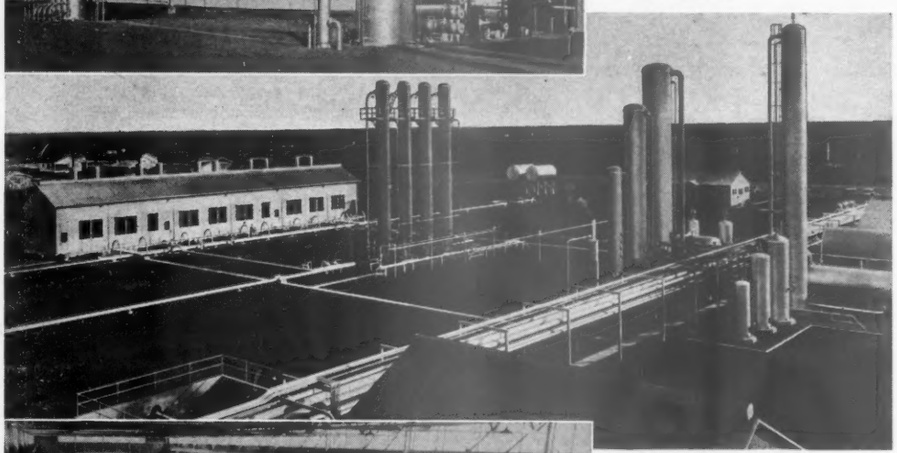


←Dehydration Plant designed for normal capacity of 260 MMCF/24 hrs. at 500 lbs.



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Efficient Inspectors Contribute To Economy in Pipe Lining

INSPECTION of pipe-line construction by company representatives presents a number of problems which deserve special consideration. Most of these have been with the industry ever since contractors engaged in the work of laying lines.

In modern pipe-line construction, various phases of the work require separate inspection. These include welding, painting or coating, ditching, lowering-in and clean up. This division of inspection work is characteristic of the procedure followed on large projects. Practices followed by several pipe-line organizations are discussed in this article.

Laying large-diameter pipe by the solid weld and slovepipe methods

Some of the major companies have adopted a policy of selecting inspectors from the force which is permanently employed in the operation and maintenance of the companies' systems. Obviously the reason is that these men have the interest of the company in mind more than those selected outside the organization. These men will be concerned with maintenance of the line when it is in service. Inspection of construction affords an opportunity to become familiar with details which may be significant in maintenance work at a later date. However, it is admitted by those directly concerned with construction work that some inspectors, selected in this way, are really inexperienced and cannot rely on their judgment in recognizing sound construction practices. As a result, they are guided by what may be learned from the specifications.

Although instructions contained in specifications are frequently lengthy and worded in such a manner that they are easily misinterpreted, experience shows that there are a few fundamentals which, if understood and applied, are sure to result in a satisfactory line. Disregard for these principles leads to trouble.

It is desirable that an inspector assigned to any one of the pipe-line construction operations should be familiar with all of the others, with the exception of welding which is highly specialized and which should be inspected by an experienced welder. For this reason inspection of welding is discussed in another article.

The ditch inspector should be familiar with the laying of pipe. To lay out a ditch for a good pipe line so as to take care of problems presented by creeks and other features of the terrain, it is important that the men responsible for the ditch know what constitutes good laying practice. Ditching problems are usually handled by the ditch inspector, chief inspector and contractor working together.

Paint inspectors receive not only specifications from the company, but also instructions from the coating manufacturer. Manufacturers often assign their own inspectors to watch paint gangs. Application of coating can be checked effectively by holiday detectors.

The pipe inspector should be thoroughly familiar with all angles of the job. He watches the actual operations of bending, installation of fittings, clamps, etc.

The importance of a competent inspector for the lowering-in gang on the larger lines has been frequently overlooked. He should be able to recognize any defects which may have escaped the attention of others. For this reason, he should be an experienced man. A line may be a good job on skids but it is not laid until it is in the ditch. Considerable trouble has been traced to improper lowering-in. If couplings are used, the inspector at this part of the work may sometimes detect one that is faulty. He is in a position to notice defective painting and improper grading. He should also designate and mark spots where soil stress may occur and where padding should be recommended.

Qualifications of Chief Inspector

The inspector-in-chief should be, and in most cases is, an all-around pipe-line man. On him rests the responsibility for the whole line. Every day he should be in touch with his inspectors and, if possible, he should contact with each gang and discuss the work with the contractor's men. He is directly responsible for a desirable right-of-way, installation of reinforcing clamps for couplings and welds, designation of paint for river clamps, the allotment and selection of the proper amount of casing for road crossings, etc. He is in close touch with the engineers and the man concerned with acquiring right-of-way. To him should come all complaints about the right-of-way, crop damages, loss of stock, carelessness of gates and fences left down. It is easy to lose sight of the fact that his business is really all along the line. Although he is supposed to arbitrate and adjust the little controversies that occur during the day, there are times when it is impossible to locate him until evening. In between his trips up and down the line, the chief inspector usually spends his spare time close to the laying gang.

The chief inspector's experience with pipe-line construction gives him judgment in adjusting differences which are responsible for little disputes. Lack of this, in certain cases, causes unnecessary shutdowns on some parts of the work. It should be mentioned that seldom is there justification for a shutdown by inspector's orders. A shutdown is a serious and costly move which can usually be avoided by the use of a little horse sense.

Most specifications and contracts insert a clause giving the company representatives power to remove incompetent contractor's foremen and em-

ployes. This clause gives necessary authority to inspectors, but this power frequently has been abused and good men have been removed from contractors' organizations when the trouble could have been cured differently. Contractors' foremen are usually capable. Contractors cannot afford any other kind. There are times when they place a good man in the wrong place and it becomes apparent to everyone concerned with the job that the sensible thing for the inspector to do is to recommend that he be moved to some other part of the work which he may be better fitted to handle. This policy tends to promote good feeling and permits the contractor to keep his organization intact. No one is infallible; harsh judgments may prove to be costly. Grounds for differences of opinion increase with the introduction of improved methods and the wider use of large-diameter pipe. The contractor's man is trying to make a showing in footage. The inspector is looking for defects. By recognizing the significance of the other man's problem, the occasions should be rare when work is retarded or stopped until the chief inspector arranges a settlement.

Firm, But Fair and Tolerant

All of the inspectors should be firm, but fair and tolerant. There are times when it must be a game of give and take. Inspectors must be able to use their own judgment and still have consideration for the contractor. Most of the arguments on the job could be avoided if company and contractor's men would have a thorough understanding at the commencement of operations. The chief inspector should see that this is done. It should be clearly recognized that they can help each other. By doing this, controversies are avoided and the quality of the work is improved. Inspectors should respect the knowledge of the contractor's men. When going is slow, contractors' men often find it hard to meet requirements of both the contractor and the inspector. Naturally contractors' foremen get on edge when a question develops into an argument. It is worse when the company man is inexperienced and depends entirely on his own interpretation of specifications in order to instruct the experienced man in what should be done.

The contracting business is highly competitive. Men in a pipe-line-company organization dislike to be connected with a project where it is obvious that the contractor is losing money, whether the cause be weather, low bids, unforeseen construction difficulties or unreasonable inspection. Present national-emergency conditions emphasize the fact that the financially sound, well-equipped contractor organizations are a distinct asset for the pipe-line industry as a whole.

Some companies are noted for having unusually tough inspection. Actually, they may not be unreasonable. However, the reputation for being tough may be expensive since it influences all contractors to raise their estimates of cost when bidding on the work of these companies. If requirements exceed those of good pipe-line practice, the news circulates through the grapevine to all contractors' organizations.

Consistency a Requisite

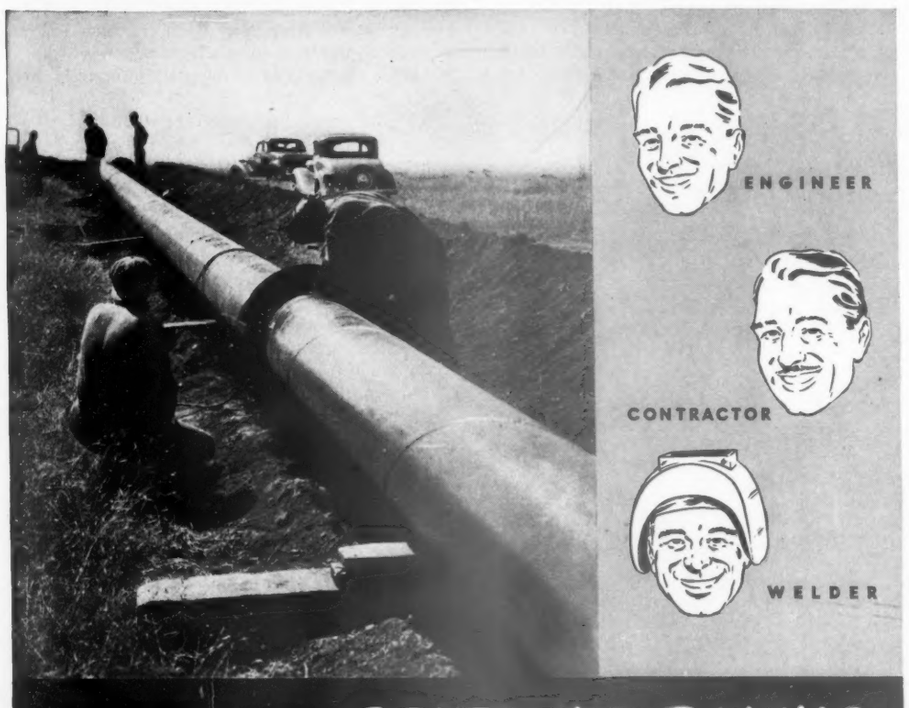
Experienced inspectors try to be consistent and practice what they preach. Inspectors, not aware of the importance of this, have been known to caution the contractor's crew against getting off the right-of-way and then, shortly afterward, they themselves will drive over crops with no consideration for the damages which the contractor may be finally required to pay. This applies also to leaving fences down and gates open where cattle are enclosed.

It is apparent that the proper place for inspection is where the work is going on and not in an automobile or in the shade of a tree. If the inspector is not attentive, work may be done which does not meet with his approval, but he is in no position to observe it. Later he may ask to have this corrected at a time when his request is unfair to the contractor. Some inexperienced inspectors have a way of running up and down the line. It is good practice to walk along the line at a slow gait which will give the inspector a chance to notice details which escape attention if he rushes. Inspectors should get into the ditch. Things can be seen there which are not apparent when looked at from above.

The clean-up work should be watched carefully. This should be inspected and accepted before the contractor's men have moved away from the area. It is unreasonable to have the contractor send trucks back several miles to do something which would have been noticed and corrected if the inspector had looked the ground over at the right time.

Owners and tenants should be consulted in regard to backfilling. Some want a high berm over the ditch. Others prefer to have it reduced. In fact, if proper provision is not made, the maintenance crew must do the work later at an unnecessary cost to the company, whose interests the inspector is expected to have in mind.

All of these points are small in themselves and may seem insignificant when considered separately but, taken as a whole, they represent aspects of the work which, if dealt with properly, can contribute to economical construction which benefits both the company and the contractor. The chief inspector and his staff are in a position to assist the contractor while at the same time requiring that the line be laid to serve the interests of the company. Harmonious relations reduce friction and go a long way toward improving the quality of the work.



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Automatic Control Employed At Intermediate Stations

ON Magnolia Petroleum Co.'s 4-in. and 6-in. finished-products line from Corpus Christi to San Antonio, Tex., it was decided that the line could be operated more economically if tankage at the intermediate stations could be eliminated without the use of any special type of pumping equipment.

Since the capacity of the line fell in a range where centrifugal pumps do not operate efficiently, a conventional piston-type pump was installed. Minor changes were necessary on the pumps to handle products—namely the addition of a force-feed lubricating system for the stuffing boxes, a suitable packing and composition rings for the pistons. The pumps are driven by six-cylinder engines using natural gas as fuel.

With the type of equipment selected two methods at once presented themselves for pressure control: (*a*) An automatic bypass and (*b*) changing the speed of the pump. Since bypassing is power wasting and suction bypassing would require a small tank, method (*b*) was selected. Changing the speed of this type engine is relatively simple, as the speed is controlled by the position of the butterfly valve in the carburetor.

The initial station, Corpus Christi, takes suction from tanks with the control on the discharge pressure and the intermediate station, Beeville, takes suction directly from the line with the control on the suction pressure.

Features of Engine

The engine is equipped with a diaphragm head and a linkage connecting the head to the butterfly in the carburetor (see Fig. 1). An air line from the diaphragm head leads to an air-operated controller which is mounted on the gage board. Air or natural gas from an outside source is supplied to the instrument at 15 lb. per sq. in. gage pressure. At Corpus Christi air is used and at Beeville natural gas is used to operate the controls. A small amount of gas escapes at all times from the instrument and gas is not recommended when the instrument is installed in a closed place. Beeville being a semiopen-air building, eliminating any hazard due to the gas. The instruments also have a ½-in. line connection to the main line where the pressure is to be regulated (see plan of piping).

For a discussion of the operation of the instrument, Beeville, which is a station on suction control, will be used but the same principles apply to discharge-pressure control. Air increase in suction pressure causes a helical coil in the instrument to rotate. This movement lowers a throttling arm over the opening of a small nozzle. As the escaping air from the nozzle is throttled, the air pressure in the nozzle line builds up. This line leads to two bellows-operated valves. One valve admits more air to the diaphragm head; the other allows air to escape from the head. The instrument is connected so that an increase in air pressure in the nozzle line admits more air to the diaphragm head which moves the engine throttle in the direction to increase the speed of the unit. As soon as the set operating pressure is reached the action of the instrument stops.

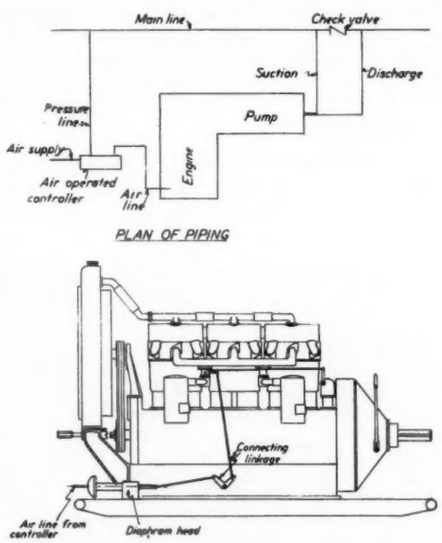


Fig. 1—Operating linkage for diaphragm head

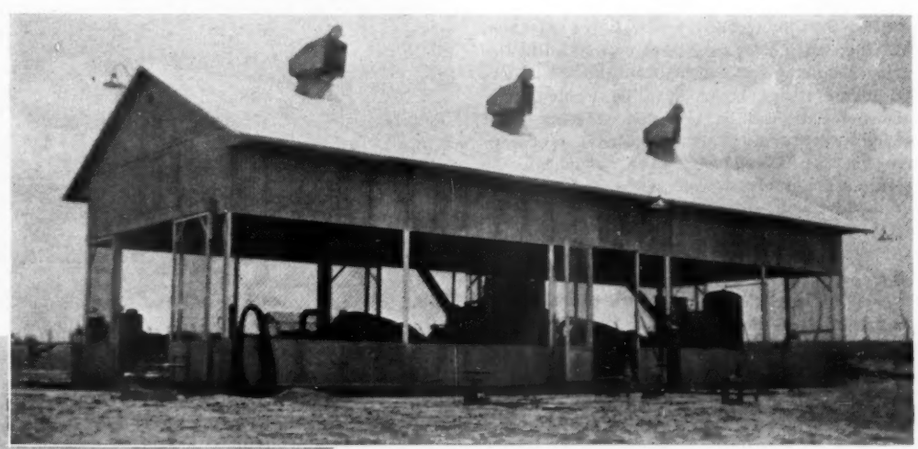
In case of a suction pressure drop the bellows-operated valve allows air to escape from the diaphragm head thereby moving the butterfly valve in the opposite direction thus slowing the engine down until the set operating pressure is reached. The operating pressures are predetermined and the instruments can be set for any desired value within the range of its chart.

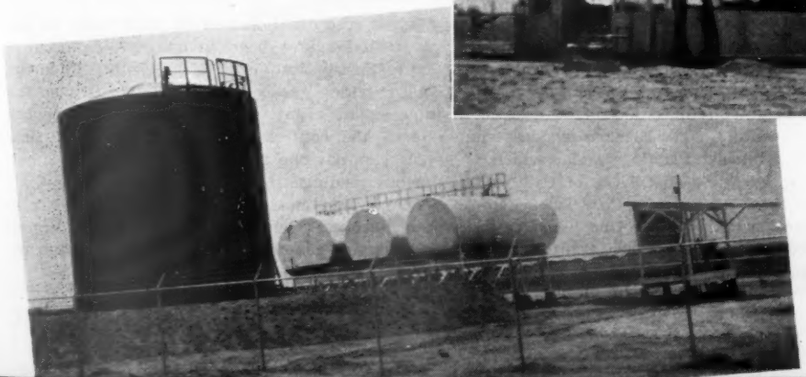
Two Stations Installed Originally

The line was originally designed with two stations, Corpus Christi and Beeville. Beeville is so located that the addition of the third station will balance the line, which is now out of balance. Corpus Christi's discharge pressure has been set at 550 lb. per sq. in. gage and the suction pressure at Beeville has been set at 22-25 lb. per sq. in. gage with the discharge at 1,000 lb. per sq. in. gage. Beeville, having no control on the discharge pressure, made it necessary to protect this line with a relief valve that pops to a sump tank. In case of engine failure at Beeville the suction would immediately rise to a high value, hence the suction piping and suction side of the pump had to be protected with a relief valve set at 300 lb. per sq. in. gage. This valve also relieves to the sump. A sump large enough to handle several minutes' pumping was installed giving the operations time to shut the incoming (1) gate valve which is all that is necessary to take the station completely off the line.

This method of operation enables the operators to detect any appreciable loss of products between stations almost immediately. A drop in discharge pressure at Beeville with no change in suction at Beeville or discharge pressure at Corpus Christi indicates a loss between Beeville and San Antonio. In case of a loss between Corpus Christi

(Continued on Page 140)



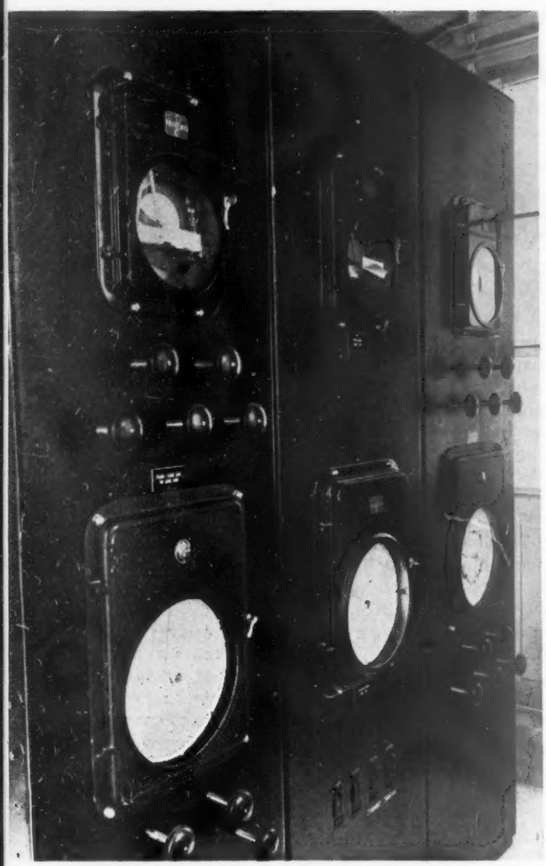


***Above:** Intermediate station housing the automatic pressure-control equipment*

***Left:** Loading rack on Magnolia Petroleum Co.'s Corpus Christi-to-San Antonio line*

Telemetering Used to Good Advantage on California Gas Line

By T. P. SANDERS



Above: Telemetering station at line junction. Instruments at upper right and upper left transmit the differential from the recording meters below, while instrument in upper center transmits static pressure. Lower center is a temperature recorder.

Right: Manifold and meter runs at Pacific Gas & Electric Co.'s telemetering station near Coalinga. Meter readings are transmitted 18.2 miles to be recorded at the Kettleman Hills compressor station.

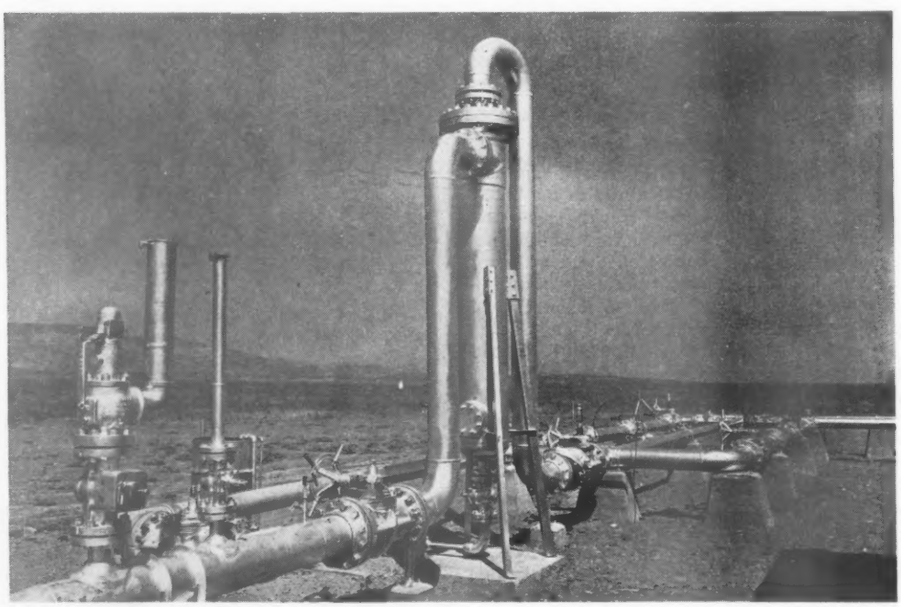
OWING to the recent introduction of telemetering, it is no longer necessary that an orifice meter should record its chart at the site where the meter flange happens to be located. The metering data can be recorded at some point where an attendant is always on hand to observe irregularities. Using such an arrangement, the meter is under closer observation and therefore serves to much greater advantage in detecting leaks, line breaks, or irregularity in the gas supply from the wells.

An application of telemetering made last month by Pacific Gas & Electric Co. on the main natural-gas transmission lines near Coalinga, Calif., serves to illustrate the type of problem that can be solved through the use of remote recording of orifice meters.

Pacific Gas & Electric Co.'s main gas-transmission system transports gas from the lower San Joaquin Valley fields to the San Francisco Bay area. At a point 18.2 miles north of the Kettleman Hills compressor station, gas from the Northeast Coalinga Eocene field enters the system through orifice meters. At present there are 10 gas-producing wells in the Northeast Coalinga field, and these produce about 10,000,000 cu. ft. per day against the 475-lb. pressure commonly carried on the gas line. For a volume of this order it was not considered practical to keep an attendant at the field meter station, and yet it is necessary that a close watch should be kept on the meters, since they could be expected to give the first indication in case of trouble arising anywhere on the Northeast Coalinga gathering system. Also, the gathering system will probably be extended in the near future to the Gatchell area of the Coalinga field, which will increase its importance.

Telemetering Ideal Solution

Telemetering was the ideal solution for the problem, for this innovation made it possible to record the volume both at the line junction and at the compressor station more than 18 miles away.



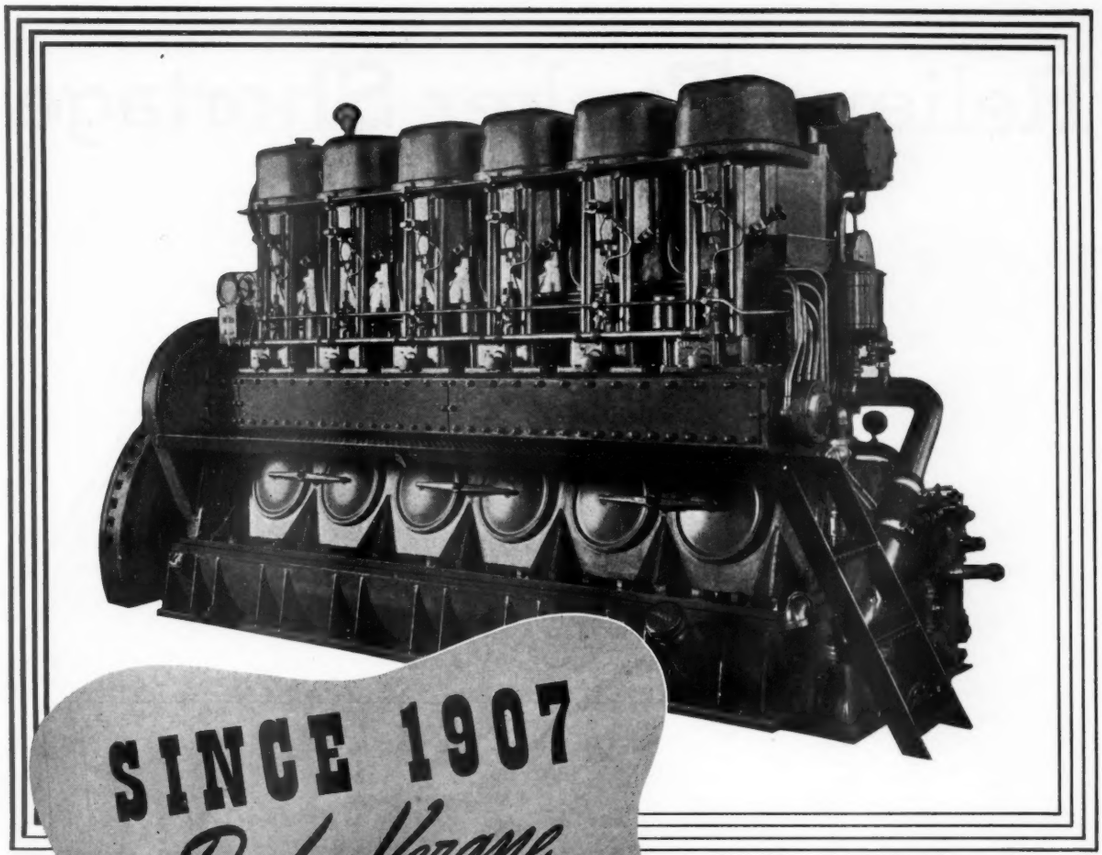
The telemetering installation is somewhat complicated by the fact that the line from the Northeast Coalinga field discharges into either of two main gas-transmission lines instead of into one. One is the Pacific Gas & Electric system; the other is the Standard Pacific system, which is owned jointly by Standard Oil Co. of California, and Pacific Gas & Electric Co. Two meters are, of course, necessary at the line junction, and the data from both meters are transmitted to the Kettleman compressor station. A temperature recorder is also used at the meter setting, but no provision has been made for relaying temperature readings since the change in weekly averages is too small to affect measurement greatly.

Three Instruments Dispatch Readings

Three instruments are used to dispatch the meter readings from the meter station to the compressor station. The static pressure is always relayed from the same transmitter, regardless of which transmission line is receiving the gas. The differential pressure is relayed from two instruments, one on each of the two meter tubes. At the Kettleman compressor station the continuous record is made on two meter charts which are identical to the charts made at the meter setup at the junction.

Meter readings obtained at both ends of the gas systems have been given new significance due to the application of telemetering. Since the rate at which gas is entering the system at the intermediate point can be read without leaving one of the control points, comparison of flow rates can now be made on the basis of simultaneous readings.

Comparisons made of the results obtained from telemetering systems with regulation meters at the point of gas delivery has proven the telemeter's accuracy and dependability.



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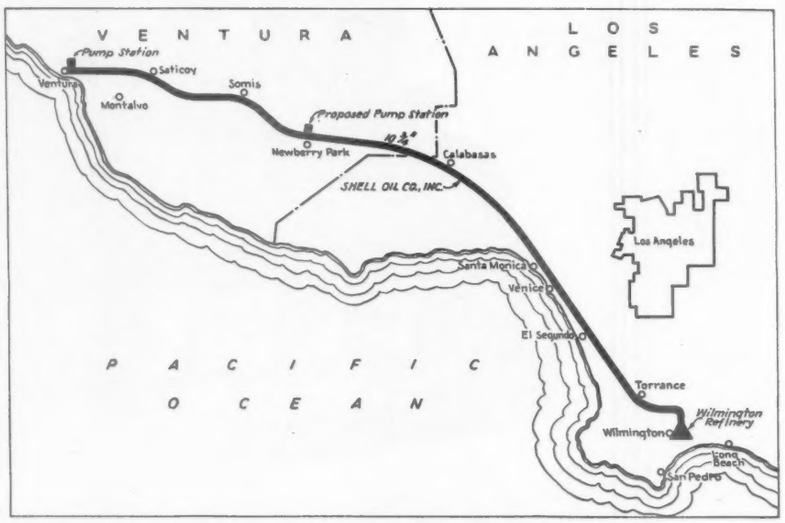
Rush Construction of Shell Line To Relieve Tanker Shortage



Above: Soft shale found in the Santa Monica Mountain section had to be loosened with jack hammers and shoveled out, since it was too hard for the ditcher. Right: Grades cleared by the angle dozers were often so steep that the ditcher had to be helped by two winch tractors. A map of the pipe-line route is shown top right

By T. P. SANDERS

THE 10¾-in. crude-oil line now under construction for Shell Oil Co., Inc., in California, is one of the projects designed to relieve the tanker shortage during the national emergency. From the standpoint of actual tanker mileage it will replace tankers now carrying crude from Ventura to Wilmington, a relatively short distance of 100 miles. But when it is considered that most of a tanker's time on such short hauls is spent in getting in and out of port, mooring, loading and unloading, the importance of the new line becomes apparent. Perhaps the most immediate relief in the transportation situation could be brought about by replacing all of the shorter tanker routes with pipe lines.

Sometime between October 1 and 15 the new line will begin delivering 22,000 bbl. of crude per day to Shell's Wilmington refinery from the Ventura field. Later an intermediate pumping station will be added which will increase the line's capacity to 40,000 bbl. per day. The large carrying capacity will be the result of using a 1,000-lb. starting pressure at the pump station in the Ventura field. While the mountainous 86-mile right-of-way necessitates an unusually large number of both vertical and horizontal bends, there is a noticeable absence of sharp turns.

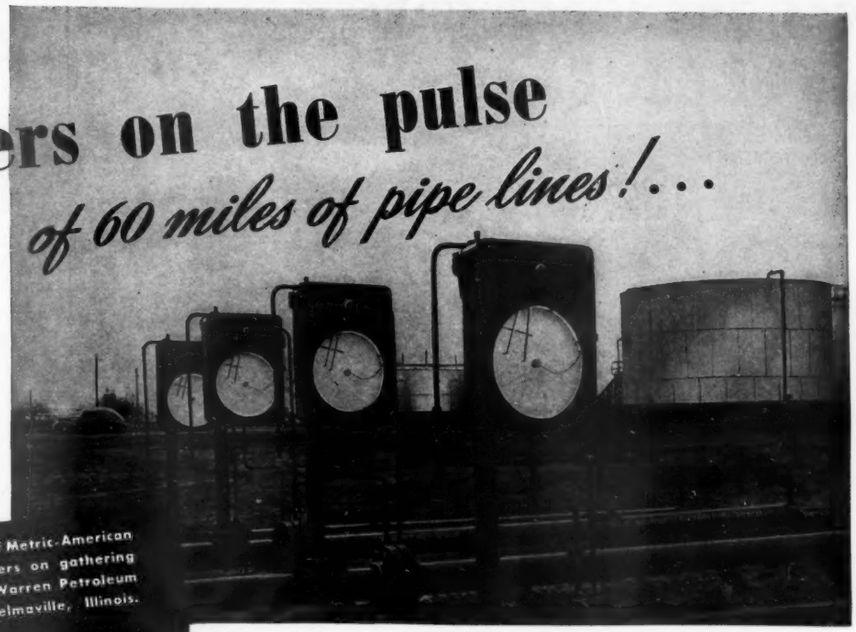
Line and Coating

All work on the line is being carried out by Macco-Robertson Co., Los Angeles contractors. Standard weight A.P.I. Grade B seamless 40.48-lb.-per foot pipe is being used. This is coated before delivery to the field with a 7/16-in. mastic coating which is applied by the extrusion process at the Los Angeles plant of Industrial Engineers, Inc. The mastic is based on specially prepared air-blown asphalt furnished by Shell from its Martinez refinery. The asphalt was developed to give the mastic coating special properties of toughness and resilience. With so many bends required along the line, the company desired to have assurance that shaping of the coated pipe in the field would not disrupt the coating in any way.

When the pipe is delivered to the field, all but 8 in. at the ends of each joint is coated. A clamp is used on the bare ends to align the joints while they are electric welded. After the line has been bent to conform to the ditch, the bare places at the joints are coated with the same mastic that is used in the coating plant. This is heated and placed inside of molds that can be clamped tightly over the line to obtain impervious applications in the field.

The roughest terrain traversed by the line is the Santa Monica Mountains sector. Here the right-of-way work and the ditching are compli-

fingers on the pulse *of 60 miles of pipe lines!...*



Central meter setting of Metric-American Recording Orifice Meters on gathering system of gas at the Warren Petroleum Corporation plant, Selmaville, Illinois.

Typical gas field line application of Metric-American Recording Orifice Meter, at Warren Petroleum natural gasoline plant.

Out in the famous Salem Oil Field, the Warren Petroleum Corporation is demonstrating to the industry new wrinkles in the recovery of iso-butane and other products . . . in big-scale operations.

Scores of METRIC-AMERICAN Orifice Meters of the "Westcott" Recording type—installed on field and gathering pipe-lines — accurately meter the vast flow from more than 700 wells . . . some 20,000,000 cubic feet of gas delivered daily to Warren's modern new natural gasoline plant.

Accuracy is a prime requisite — in the orifices, and in instrument assembly. "Westcott" dependably supplies this accuracy . . . through design simplification, exclusive features in sensitive operating mechanism, and provision for easy low-cost maintenance.

There's considerable satisfaction in knowing what AMERICAN measurement engineering today is contributing to the efficiency of field operations which yearly set new standards. May we tell you the story in detail if you do not have it?

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AMERICAN METER COMPANY

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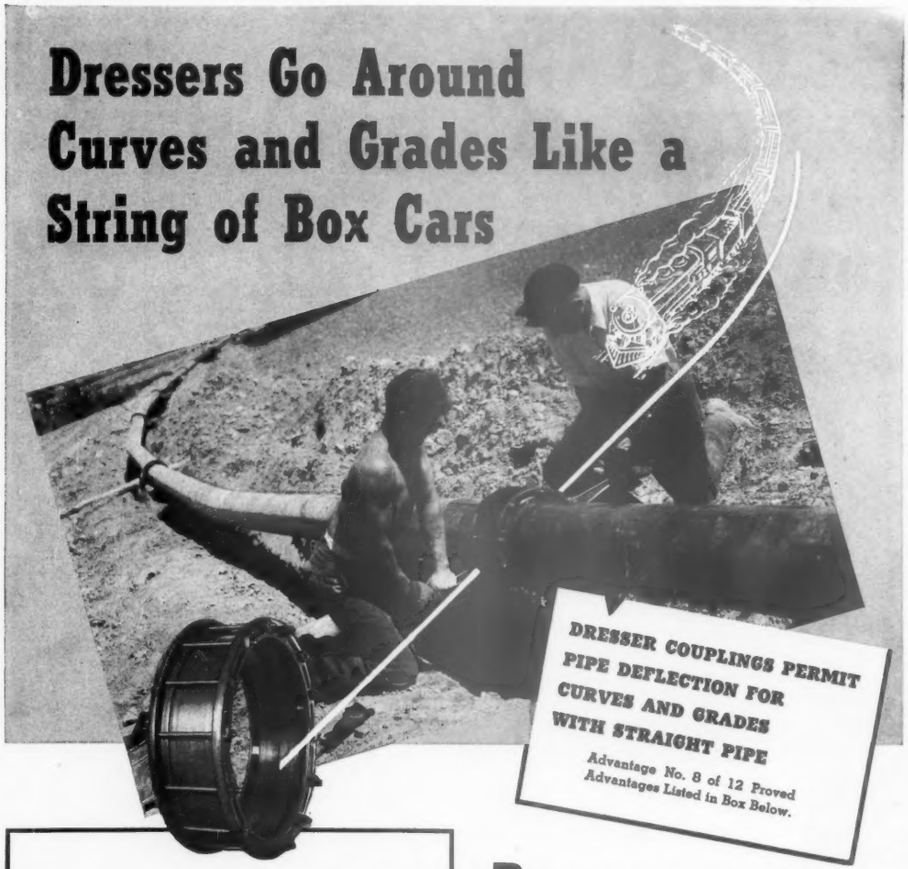
Dressers Go Around Curves and Grades Like a String of Box Cars



Check THESE 12 PROVED ADVANTAGES THAT ONLY DRESSERS GIVE YOU

1. Dresser Couplings eliminate all uncertainty in joint-making.
2. Dresser Couplings permit use of local, untrained labor.
3. Dresser Couplings provide the only time-proved method of absorbing expansion and contraction.
4. Dresser Couplings give greater speed.
5. Dresser Couplings simplify both pipe and joint specifications.
6. Dresser Couplings can be installed regardless of weather, wind, or rain conditions.
7. Dresser Couplings eliminate "fussy" operations.
8. √ Dresser Couplings permit pipe deflection for curves and grades with straight pipe.
9. Dresser Couplings reduce cost of supervision and inspection.
10. Dresser Couplings cut maintenance costs.
11. Dresser Couplings are fool-proof, strong, *permanently* tight.
12. Dresser Couplings eliminate health and fire hazards.

Rough, hilly country is bound to increase the expense and decrease the speed of pipe-line construction—that is, if your crew has to make numerous field bends and use many special fittings to adjust the line to the contour of the ground.

Use Dresser Couplings, however, and you eliminate the need for many costly field bends and "specials." For Dressers make the line flexible—permit deflections of as much as 6° *with straight pipe*—and still assure permanent tightness at every joint. Your pipe goes around curves, up and down grades, like a string of freight cars!

Get this assurance of fast, low-cost construction on your next project. Specify Dresser Couplings.

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cated by the fact that the line must everywhere be buried at least 24 in. deep in solid ground. This specification applies even when the line must cross deep V-shaped ravines. It is a precautionary measure to insure that the line will be well insulated against heat in case of fire in the mountains.

Possibility of fire must also be considered during welding work. The contractor is obliged to maintain an array of fire-fighting equipment along the line where welding or other operations are in progress.

The Pump Stations

Since the new line will handle cold oil only, the pump station will be simpler than those on most California lines. It is being constructed under contract by J. B. Gill, Inc., of Long Beach. Three centrifugal pumps are to be driven through step-up gears by three 6-cylinder 275-hp. gas engines. Jacket water will be cooled by radiators placed outside of the building.

Work Progressing Rapidly

Construction of the line was started on August 2, and for the sake of speed, crews were put to work at both ends and also in the center to work in both directions from a point near the town of Calabasas. The contractor employs eight D8 diesel angle dozers for preparing the right-of-way ahead of the ditcher, and eight RD5 and RD6 tractors for handling pipe. Two new D8 tractors were immediately rigged for pipe handling, and these are probably the largest units used for placing and bending pipe.

The entire pipe-line job is under the supervision of the pipe-line and engineering departments of Shell Oil Co., Inc., at the Los Angeles office. The men directing the work for the contracting firm include F. W. Case, general superintendent; Ed L. Palmer, general foreman; and Les Pratt, superintendent.

A better-than-average spirit is observed among workers and foremen on the line. Uppermost seems to be the conviction that the project was of importance to the nation's defense. The display of voluntary effort seen along the right-of-way spoke well for the future of pipe-line construction as a preparedness measure.

●

Automatic Control Employed At Intermediate Stations

(Continued from Page 135)

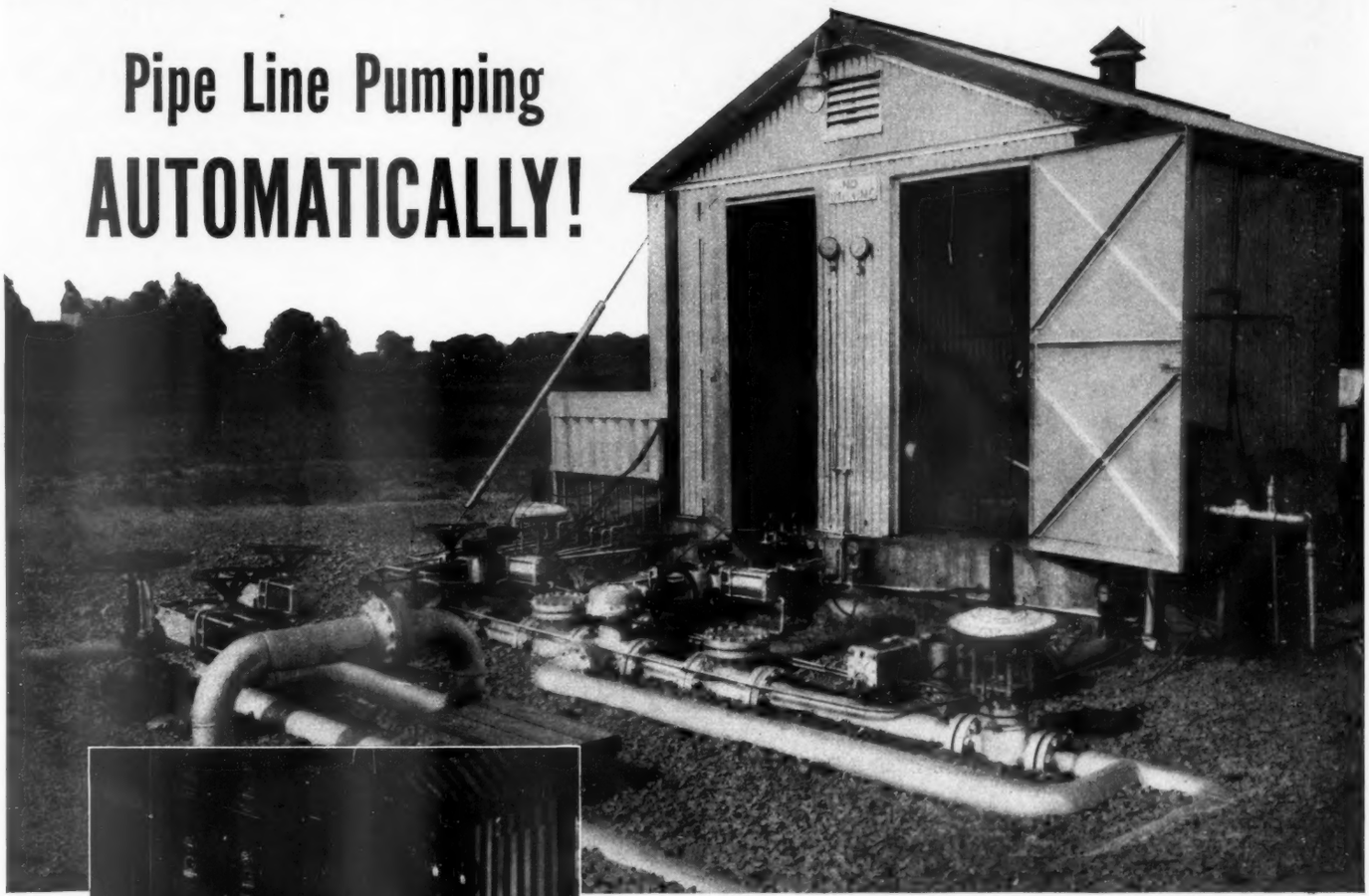
and Beeville the control at Corpus Christi will try to maintain the set discharge pressure which will speed up the unit and immediately attract the attention of the operator. At the same time Beeville will automatically slow down, attracting the attention of the operator there. He will notify Corpus Christi of the change and steps to locate the trouble will be taken.

The reciprocating piston-type pump gave considerable ring trouble at first when operating at 1,000 lb. per sq. in. gage pressure. Various bakelite rings, leather cups and synthetic rubber cups were tried without much success until recently when a ring was developed which has been giving satisfactory service. The stuffing boxes are lubricated with castor oil and have given practically no trouble since their installation.

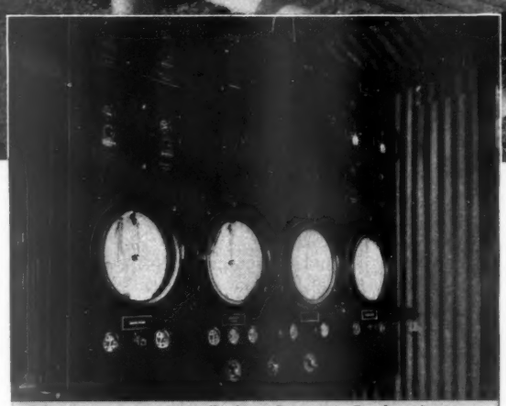
This method of operation has proved very satisfactory; the control instruments having given no trouble since their installation about 18 months ago. The stations were originally equipped with surge bottles on both t . suction and discharge but the operation has been so smooth that it has not been necessary to use either.

START–STOP–CONSTANTLY CONTROL

Pipe Line Pumping AUTOMATICALLY!



Bradner Booster Station of the Toledo-Lima Pipe Line of The Standard Oil Co. of Ohio. This line is reversible for pumping gasoline in both directions.



Completely automatic Foxboro System in Bradner Station. The instruments, left to right, are: Discharge Pressure Controller, Stabilog Suction Pressure Controller, On-Off Suction Pressure Controller and Flow Controller.

Time-proved Foxboro Instrument Systems cut supervision . . . . . step-up operating efficiency

Controlling pumps to keep gasoline or crude oil moving *fast* through pipe lines is an every-minute job no human operator can perform with maximum efficiency. It takes modern automatic instrumentation, too . . . systems that continuously "feel" flow conditions, and give definite control action.

Positive Protection. Foxboro pioneered instrumentation for this vital service . . . developed systems that instantly react to abnormal conditions by automatically shutting down pumps before damage can occur. In the past 5 years, many have been installed to protect major pipe lines.

Fully-Automatic Operation. Now, a further Foxboro advance is instrumentation that not only shuts down operations, but automatically re-starts pumps, and constantly controls pump motors! A completely-automatic Foxboro system of this type was installed over a year ago on the 104-mile Toledo-Lima Pipe Line of The Standard Oil Company of Ohio. Similar Foxboro Systems are now specified for one of the major lines now under construction.

Use Our Experience. In planning your own pipe lines, let Foxboro's experience help you obtain installations geared to modern demands for speed, efficiency and minimum supervision. Simple or complex, Foxboro can supply the right instruments. Write us your problem. **The Foxboro Co., 60 Neponset Ave., Foxboro, Mass., U. S. A.** Branches in principal cities.

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Creative Instrumentation

Cleaning the old wrap off the used pipe. In right background can be seen the top of the wrap being cut with a spade while the high-pressure kerosene and air torch is applied to one end to melt the old coating so that the wrap sloughs off cleanly

Reclaimed Pipe Is Used In the Construction of Grapeland Field Line

By R. MARNE SANFORD

A NEW 12-in. gas line has been completed in eastern Texas by Lone Star Gas Co., Dallas, and is ready to be placed in operation between the company's recycling plant at Grapeland and its main 20-in. line at Long Lake. It is the most southeastern extension of Lone Star's lines into eastern Texas and connects the large gas reserve at Grapeland field in Houston County with the main 20-in. distribution system from Long Lake into Central Texas.

Not actually increasing the volume of the company's distribution system, the 19-mile 12-in. carrier is intended mainly to augment the eastern branch of the system and furnish needed reserve during the peak-consumption months. All gas moved will be in excess to the amount being recycled at the company's plant in the Grapeland field. The gas which will enter the line has been stripped of its heavier hydrocarbons and is of the same grade as that which is being returned to the Grapeland field's producing formation.

The Lone Star Co.'s Grapeland recycling plant was completed last year with a 50,000,000-cu. ft. per day capacity. It is at present turning out three separate grades of motor fuel in addition to kerosene, butane and distillate. The new gas outlet will total seven distinct products being finished at the plant.

The pipe line runs northwestward from Grapeland to Long Lake and is through a heavily wooded section just on the east side of the Trinity River. All used pipe was laid, it having been dug up from an abandoned West Texas line. Extreme difficulties were overcome in the clearing of the right-of-way and ditching due to the heavy tree growth, sandy soil and abundance of swamp.

After the right-of-way was cleared and the stumps blasted, the ditching machine averaged about 6,000 ft. per day. The ditch was 25 in. wide and 38 in. deep. At times, due to the loose sand and swampy conditions, it was necessary to pull the trucks in and off of the right-of-way with tractors.

The used pipe laid along the right-of-way was still covered with the old wrapping. A swift, economical and efficient means was employed for removing the old wrapping. A high-pressure kerosene and air torch was stuck in each end of the section of pipe and in less than a minute after the top had been cut, the heat melted the old coating under the wrap so that the entire wrap along the whole section of pipe sloughed off. The end-joint filers next cleaned the pipe ends, after which they were tack-welded. There were two tack welders and five finish welders working on the job.

The line was electrically welded, using 200-amp. 40-volt welding machines. The stovepipe method was used. Machines were mounted on mule-drawn wagons and each welder averaged about 30 to 40 welds per day.

The pipe was cut and cleaned and primed in one operation. A traveling-type cleaning machine was employed. The pipe was covered with an asphalt-base coating and the two layers of wrapping. The inner wrap was kraft paper, while the outside was a treated asbestos felt paper. Coating and wrapping was done by machines. Each of the two wraps was 12 in. wide and the roll contained 400 ft. which would wrap 80 linear ft. of pipe.

Following the wrapping machine was the holiday unit which located by electric arc all flaws in the coating. These flaws were chalk-marked and rewrapped by hand.

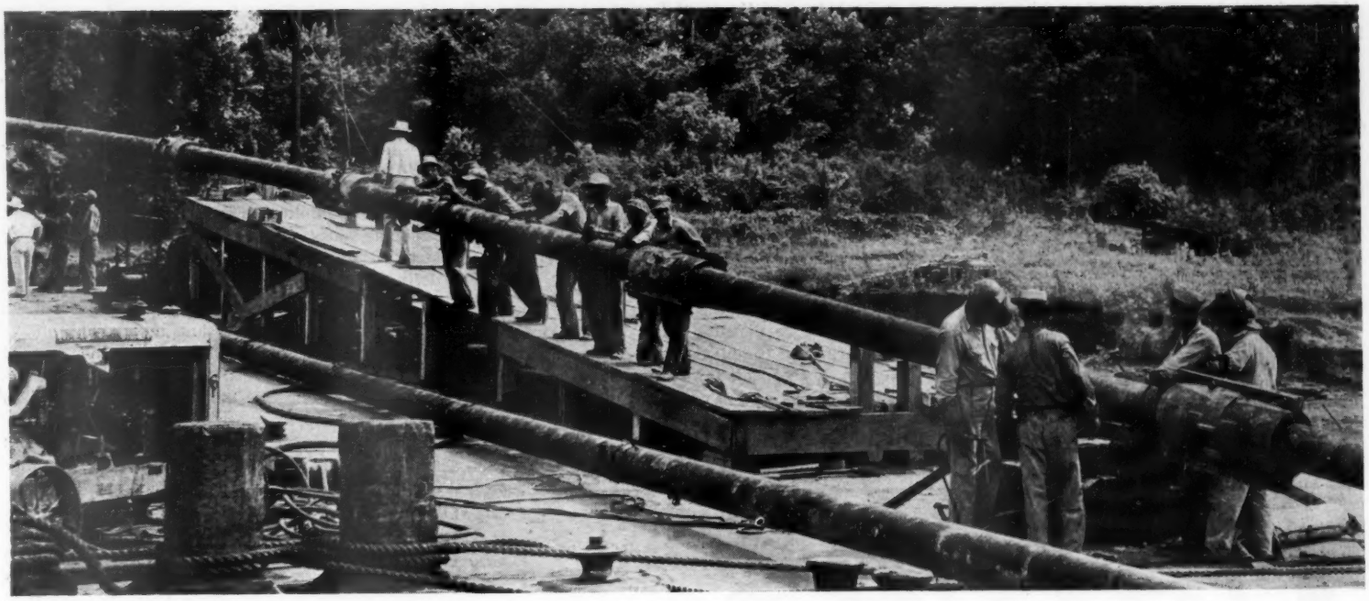
The back filler then covered the pipe. During most of the laying of the line the distance between the tack welders and the backfiller was only about a mile.

The line will be tested under a 500-lb. pressure when entirely completed. Working pressure of the line will not, under normal conditions, exceed 500 lb.

Under hypothetical pressures (pressures under which the line will normally operate) an idea of the operating volume may be determined. With an input pressure of 500 lb. at the Grapeland recycling-plant end of the line and a discharge pressure of 250 lb. at the Long Lake end, the 12-in. line would transmit some 67,500,000 cu. ft. of gas daily.

Only during peak-gas-consumption periods of the year will the volume exceed this figure.

Left: Coating and wrapping machine in action. Right: Unit which locates by means of electrical arc any flaw in the wrapping of the pipe. The wire points make contact with the steel of the pipe and cause a static disturbance. Each flaw is marked and rewrapped by hand



The last joint is now welded and the line is ready for lowering to the river bed, approximately 90 ft. deep at this point. The channel of the Mississippi is only 2,800 ft. wide at this point and barge men had to contend with a swift current

Mississippi River Crossings Laid in Record Time

(Continued from Page 89)

so 10 anchors were set in the river bed. Tugboats moved the barges from anchor to anchor as the work progressed and the anchors kept the barges lined up in working position. Transportation to and from the various barges and the shore was furnished by a speedboat.

The 100-ft. sections of pipe were laid down on the inclined ramp, one end resting in the welding clamp. Two welders worked on the joints and as each length of pipe was welded, it was lowered into the river by means of the derrick and three auxiliary barges. These barges were made fast to the pipe which was in the river and each time a length was lowered, enough line was slacked off from each barge to allow the proper amount of pipe to rest on the bed of the river and also to insure its coming up to the work barge at the proper angle for welding in the clamp. This angle was about 25°, the same angle as the inclined platform constructed on the work barge. A stringer and three beads were run on each weld.

River clamps weighing 1,000 lb. were bolted around the pipe at 20-ft. intervals to give the line

Pat. Pending

HUSKY WELDING CLAMP

for Speed

Here is a proven clamping device for the welding of all thin wall hi-tensile line pipe. Positive. Exerts sufficient pressure to remove all "egg" from thin wall pipe. Practical for all weights of line pipe.

Husky Manufacturing Co.

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You can save chromium for defense and save money in your own plant by using our Chrom Glucosate. You are wasting chromium, badly needed in our National Defense program, when you use it for corrosion control instead of chrom glucosate.

Look at this table of comparison. It tells a commanding story.

COMPARATIVE CHROMIUM CONSUMPTION USING GLUCOSATES AS COMPARED TO CHROMATES

Amt. in form of Glucosate	Amt. as dichromate	Application	Saving
	SODIUM BICHROMATE		
17 pounds	100 pounds	Calcium Brine	83 lbs.
17 pounds	200 pounds	Salt Brine	183 lbs.
34 pounds	500 pounds	Cooling Water	466 lbs.
	CHROMIC ACID		
3 pounds	66 pounds	Calcium Brine	63 lbs.
3 pounds	132 pounds	Salt Brine	129 lbs.
10 pounds	330 pounds	Cooling Water	320 lbs.

Help us to stop the waste of chromium ore. Switch to Chrom Glucosate at once and tell your business acquaintances the story of Chrom Glucosate too.

Furthermore, there are other glucosates that eliminate the need of chromium. Let us send you the whole story.

WATER CONSULTANTS

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additional weight which would make it lie in place on the river bed and overcome any buoyancy as well. In one line, river-lock safety sleeves were placed over every weld. All welds were carefully inspected.

Inventory engineers were kept on the barge during the entire job as the record of the material used had to be taken before the line was dropped into the river.

Laying of the line started July 21 and the first line was completed in 43 hours. The second crossing was started immediately, and working time was cut by 5 hours on this job. The third and last line went across in 52 hours. Extra time on this line was due to installing of safety-lock sleeves. The lines were laid 200 ft. apart. A crew of 25 men was employed on the barges to handle the pipe and these men were supplemented by a crew of 28 barge men.

The river crossings was engineered by United Gas Pipe Line Co. and contract was let to Brown & Root, Inc., of Houston, Tex., for the entire 200 miles. Construction of the river crossing was under the direct supervision of R. O. Mitchell of Brown & Root, Inc., and Tracy C. Wilmuth, inspector for United Gas Pipe Line Co.

●

Field Tests of Pipe Materials And Pipe Coatings in Soil

(Continued from Page 87)

not marked during the early period of exposure, becomes more definite after 5 years' exposure. Comparison of the pit depths on the copper-nickel steel with those on low-carbon steel only (Material N) shows only 8 cases out of 40 where comparisons are possible (that is, where specimens of both materials have not failed), in which the pits were deeper on the copper-nickel steel than on the plain steel. Five of these cases occurred during the initial period of exposure. The benefit of small quantities of nickel and copper in steels in roofing tests under alternate wet and dry conditions has been noted by Pilling and Wesley,[3] although no improvement was observed by these investigators in submerged corrosion tests. Aside from the question of the effect of nickel in steel exposed to soils, the data of Tables 2 and 3 indicate that chromium in steel up to 5 to 6 per cent probably does not reduce the corrodibility of steel in soils except perhaps under certain undefined soil conditions.

The results of the Bureau of Standards field studies of corrosion-resistant metals and alloys indicate that for each soil condition some material can be found which is superior to other materials, but that no one material is superior to all others in its price class for all soil conditions. Under nearly all soil conditions copper pits less and loses less weight than steel, but whether copper is more or less corrodible than brass depends on the soil condition under consideration. It is possible by means of a study of soil properties to select the pipe material best suited to each soil condition to be encountered. However, on a large pipe-line system where there are likely to be many diverse soil conditions, it is doubtful whether the saving effected by such a study and by the installation of a variety of pipe materials in accord with the results of the study would be profitable because of the additional expense.

It is a matter of some interest to compare the results of field tests with the corrosion experienced in the operation of pipe lines. Several such comparisons have been made.[4]

In general such comparisons are unsatisfactory and inconclusive largely because of incidental factors which may retard or accelerate the normal corrosion resulting from the action of the soil. Among such factors are the presence of "long-line" currents, interaction of interconnected pipe lines, electrolysis, and the effect of protective coatings, etc. Under certain conditions rust and compact soil may prevent leaks for some time after corrosion has punctured the wall of the pipe. This, of course, results in an apparent rate of pitting lower than the true rate. As a general rule, however, the time required for the development of a leak in a pipe line is greater than the time indicated by a field test conducted in the same soil type.

2. *Pipe coatings.*—Field tests of pipe coatings are perhaps somewhat less satisfactory than tests of pipe materials. The determination of the resistance of a pipe material to corrosion by the measurement of the depth of one or more pits on a unit area or by counting the number of punctures of a sample of the material in a given time is a generally recognized practice. There is no similar agreement on the way in which the effectiveness of a pipe coating should be determined. One group holds that the condition of the surface to which the coating was applied is the proper criterion of the effectiveness of the coating. This group holds that the appearance of the coating, i.e. whether it is wrinkled, distorted, cracked, or changed chemically, is of no immediate importance if the pipe beneath the coating is free from corrosion. This group may be subdivided between those who think that any corrosion on the coated surface is an indication of a failure of the coating and those who associate the degree of failure with the depth of the pit. Obviously the depth of the pit is largely a function of the corrodibility of the metal to which the coating was applied and of the corrosiveness of the soil.

Another group judges the effectiveness of a

[3] N. B. Pilling and W. A. Wesley: Atmospheric Durability of Steels Containing Nickel and Copper, Proc. A.S.T.M. 40, 643, 1940.

[4] K. H. Logan, Engineering Significance of National Bureau of Standards Soil-Corrosion Data. J. Research NBS 22, 109, 1939; RP1171.

Valves for pipe lines

Fig. 170 400-lb. Test | Fig. 187 700-lb. Test | Fig. 177 1000-lb. Test | Fig. 192 1600-lb. Test | Fig. 79 2500-lb. Test

A FULL range of sizes for low, moderate, high and extreme pressures are included in the large Kennedy line of valves for oil and gas industry services. Each type is specially designed for the particular requirements of the service for which it is intended, with a large factor of strength and with many special features of design that assure trouble-free service and long life.

Kennedy Valves can always be depended upon to close tightly, release promptly at the first turn of the valve wheel, and to open or close without sticking or binding whether operated frequently or at long intervals.

The Kennedy Valve Mfg. Co., Elmira, N. Y.

KENNEDY

Extra Value in VALVES

coating by its condition regardless of the condition of the pipe beneath it. The number and size of the openings in the coating, its electrical resistance, distortion, and change in physical or chemical condition are the criteria by which the value of the coating is determined.

To this unsatisfactory lack of a standard for determining the condition of a coating must be added uncertainty as to what constitutes an adequate sample. There arises a problem similar to that of the pit depth-area relation for pit depths. The problem is complicated by the fact that many coatings are much less uniform in composition and thickness than most samples of metals. Another reason for unsatisfactory testing conditions with respect to pipe coatings is the tendency of manufacturers and consumers to regard a pipe coating as a material. A satisfactory coating is more than a material or combination of materials. It includes the application of the material to the pipe, the placing of the pipe in the trench, and the covering of the pipe with soil. Failures of coatings are largely results of the way in which the materials have been treated and are attributable to the materials only because they cannot withstand the rough treatment which is incidental to pipe-line construction. Nevertheless, this rough treatment is an essential feature of the conditions which coatings encounter. It can be reduced but it will not be eliminated. In tests of coatings it is usual to eliminate this cause of coating failures in so far as possible and to disregard any failures of coatings which are obviously the results of mechanical injuries. As a result of this testing policy some coatings which appear satisfactory in field tests prove unsatisfactory when used on a pipe line and the coating tests are discredited.

Those who plan tests of coatings should have clearly in mind the purpose of their tests. If this purpose is to be limited to determining the resistance of the coating material to soil stress, moisture absorption, aging, or some similar phenomenon the test might well be performed in the laboratory where the forces involved can be measured and controlled. However, the report on the test should clearly state that the results do not necessarily indicate whether the coating will protect a pipe against corrosion. If, on the other hand, the object of the test is to determine whether the use of coating material will result in satisfactory protection to the pipe, the plans for the test should simulate the conditions which the coating will encounter in service. This was attempted in the A.P.I. coating tests previously referred to. These tests were started in 1930 and completed in 1940 at a cost of more than $100,000. The plans for the test were drawn jointly by the coating manufacturers, pipe-line operators, and representatives of the Bureau of Standards and were the resultant of the best thoughts of those most familiar with coatings and coating tests.

To simulate pipe-line conditions certain of the coatings in the A.P.I. test were applied to operating lines. Sections of pipe were left uncoated, between groups of coatings in order that the effectiveness of the coatings might be determined by comparing the condition of the coated and unprotected pipe from time to time. Uncoated sections of small-diameter pipe were laid in the trench beside the coated line as control specimens. Coatings were also applied to short sections of small-diameter pipe to provide a comparison between the results of such tests and those of line tests.

The results of the A.P.I. tests raised almost as many questions as they answered, most prominent among them being the effect of the alternation of protected and unprotected sections of pipe on the intensity of corrosion on the coated areas. Another interesting question is whether the presence of a hole in a coating results in more rapid corrosion than would occur on an uncoated pipe subjected to similar soil conditions. Another question has to do with the extent to which poor application of the coatings was responsible for their failure to completely protect the pipe. There is also the contention that the results are of no practical importance because coating materials and practice have been improved since the tests were installed 10 years ago. Corrosion tests which simulate normal conditions necessarily require a long time and consequently are always subject to the criticism that the results are out of date. The surprising thing is that so many people are willing to accept the unsupported claim that the new materials are superior to the old ones. It is highly probable that some of the defects in the old materials have been corrected but it is almost as probable that other defects or sources of weakness have been introduced. The improvement resulting from modification in a coating can only be revealed by the service record of the new material.

Summary

Field corrosion tests have resulted in an understanding of the conditions under which pipe lines corrode. In adding to our knowledge of what may be expected from pipe materials, field tests have discredited several legends regarding the corrosion resistance of certain materials and have led to the development of improved products for use underground. Because of the variability in the corrosiveness of soils within limited areas, the results of field tests are subject to wide variation. Nevertheless, it seems possible to detect differences of practical significance in the performance of materials. In the future, field tests may be expected to indicate the directions in which improvement in the corrosion resistance of metals and alloys should proceed, and to uncover the limitations of conclusions reached through tests.

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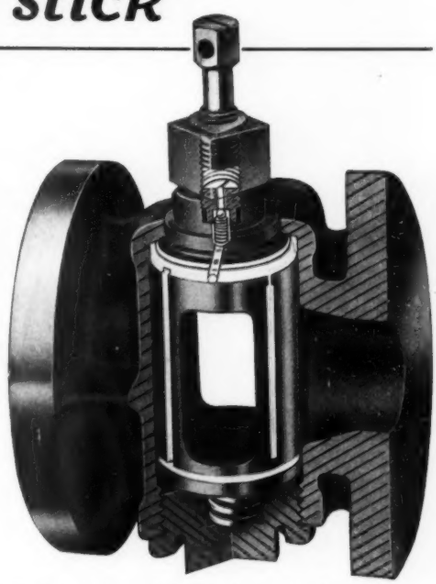
...that cannot stick

Newman-Milliken Glandless Lubricated Plug Valves employ a parallel plug which is never raised from its seat when the valve is operated. The plug rotates freely under all pressures in a film of insoluble plastic lubricant and cannot stick, jam or corrode. The lubricant also positively seals the valve against leakage and against the entry of foreign matter between seating surfaces. Newman-Milliken Valves have no gland, packing or gaskets. Note also the full area port streamlined flow. They are made in a variety of patterns and metals suitable for all oil field services, particularly for Christmas trees and mud lines up to 3,000 lbs. working pressure per square inch.

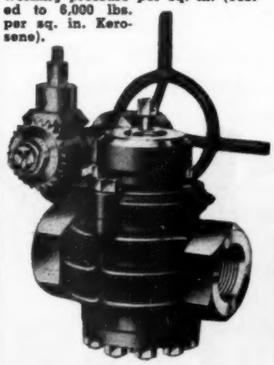


Sectioned view of rectangular port valve showing parallel plug and lubricant grooves. **Full round port valves are also made.**

Special Features of Newman-Milliken Valves

Parallel plug always in close working contact with its body seating ★ No gland, packing or gaskets ★ Self Sealing ★ Visual Check on full lubrication ★ Port openings equal to full size pipe area ★ Opened and closed by quarter turn of plug.

Newman-Milliken gear-operated round port valve for 3,000 lbs. working pressure per sq. in. (Tested to 6,000 lbs. per sq. in. Kerosene).



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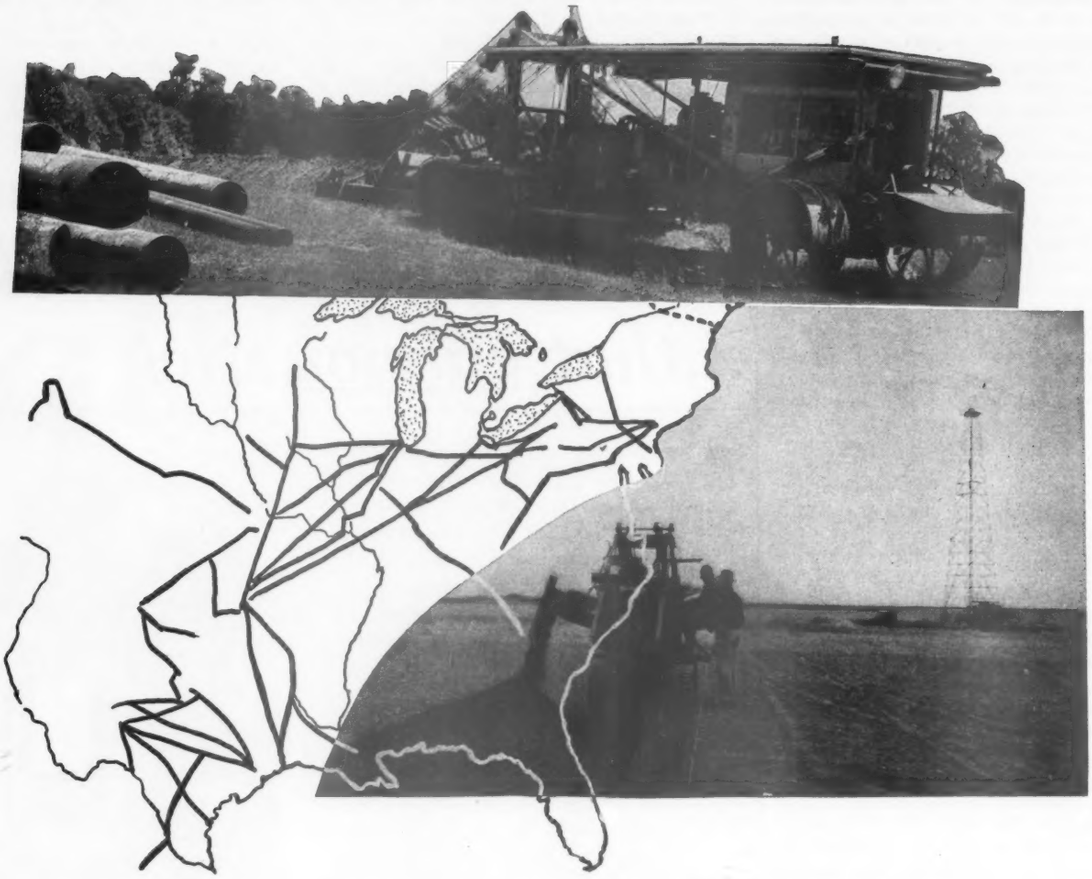

—and Buckeye Trenchers dug most of the trench for it! Enough to go several times around the earth—to say nothing of the thousands of miles of pipeline trench Buckeyes have dug in other parts of the world.

Whether it's trunk or gathering lines—across a lease or across a nation—the fastest and least expensive way to make trench is the Buckeye way!

Six models designed specifically for pipeline work—not a "lacy pants" in the lot—tough, rugged, simple—built for years of service with minimum maintenance. Levantine sands, mid-continent clay, Venezuelan marsh—put a Buckeye to work in any terrain and you get trench—on schedule.

For real teamwork, put Buckeye Backfillers and Bulldozers to work with your Buckeye Trenchers.

BUCKEYE TRACTION DITCHER CO.
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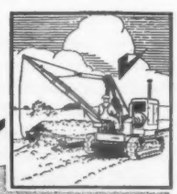

Built by Buckeye

Future Trends in Pipe-Line Practices

(Continued from Page 83)

finery gases and petroleum derivatives. A few years ago one would have questioned the practicability of transporting through a pipe line more than one class of product. Today, as many as eight different products representing several grades of gasoline, butane, distillate, tractor fuel and kerosene (covering the range of colors in the rainbow) are transported through single long products lines. This successful operation may be the forerunner of a more extensive use of pipe lines for transporting a wider range and a greater variety of liquid hydrocarbon products that will be used for fuel and other purposes unforeseen at this time. In recent technical literature one finds discussions of transporting colloidal fuels by pipe line. When in the more distant future, the reserves of natural gas and petroleum cannot be depended on to meet the heavy demand for liquid and gaseous fuels, we might even anticipate the use of pipe lines for the transportation of gases and liquid hydrocarbons produced from coal by a simpler process than known at the present time.

Fifteen Years of Progress

Before discussing future trends, the progress of the industry in recent years should be brought up to date. The industry has made satisfactory progress and will continue to do so; but time is required to change over from the old to the new. Pipe-line systems built before 1928 have been affected more seriously by the important improvements, which came after that time. During this period, new materials and methods have been used effectively to modernize most systems. Seamless or electrically welded 40-ft. pipe, having higher tensile strength and considerably less weight per foot, has replaced and made obsolete the 20-ft. lapweld, lower tensile strength, heavier screw pipe, which had been used as a standard in the industry for years. By higher tensile-strength steel (70,000 lb. vs. 50,000 lb.) the weight of 12-in. (37.45 lb.) used today is less than standard weight 10-in. (38.20 lb.) used customarily 5 years ago. Compare, in the table below, the weights of pipe used today and the standard weights used only a few years ago.

Size of pipe	Std weight per foot	Wt. per ft. used now
8-in.	28.57	25.06
10-in.	38.26	31.45
12-in.	49.56	37.45

Pipe sizes larger than 12-in. are coming into more extensive use for trunk lines. Sizes below 12-in. will be used less extensively in the major trunk-line systems and will gradually become an obsolete size for this service. The advent of electrically welded butt joints made the screw joint obsolete for the construction of long trunk pipe lines. At the same time, this type of construction made possible the use of thinner-wall pipe and gave greater assurance of leakproof lines. Forged steel fittings came into use to replace cast-iron screw fittings. Cast-alloy-steel valves, suitable for high pressures, are displacing the cast-iron valves suitable only for low-pressure operations. The ring joint with metal gasket and tongue and groove joints, used more extensively in recent years, is a fine improvement over the flat-face gasketed joint. The ring joint has contributed materially in making possible the higher operating pressures. Some recently constructed pumping stations and lines have been designed for and are operating at pressures of 1,000 to 1,200 lb. instead of the customary 700-lb. pressure. The modern diesel engine, having higher speeds and less weight, and consequently more compact, is a remarkable improvement over some of the slower speed and cumbersome equipment installed at pipe-line stations in earlier years. Increasing the speed of centrifugal pumps from 1,800 to 3,600 r.p.m., thereby increasing the efficiences to nearly 80 per cent, has extended the use of centrifugal pumps for crude-oil pumping especially for field gathering and temporary stations. Because of special advantages, centrifugal pumps are used almost exclusively for gasoline and products lines. The gear increaser has been a valuable application in pumping-station equipment; through its use, gas and diesel engines having speeds of 400 to 600 r.p.m. are used for driving 3,600-r.p.m. centrifugal pumps. In recent years, this type of equipment has been used to good advantage in simplifying the design and reducing the cost of field gathering stations. The portable multicylinder engine and piston-type pumping unit, good for pressures up to 800 lb. and installed very often without shelter, have been used as field gathering stations for capacities up to 25,000 bbl. daily. Because the installation is simple, almost completely salvable, and can be installed on short notice, this type of equipment has eliminated the expensive, conventional-type pumping station that had been used in the industry for years. It represents one of the valuable changes made in the industry's recent progress. Semiautomatic pumping equipment, tried out first about 12 years ago, is being used advantageously in field gathering systems, for pressures up to 450 lb. Orifice meters are now used extensively for interpreting drops in pressure and for dispatching purposes. The value of displacement meters in gathering and trunk-line operations cannot be fully appraised at this time. Four years ago, metering for crude-oil and gasoline pipe lines was in the experimental stage; today, it is an accepted practice. The benefits of metering are too numerous, and a discussion of its valuable applications is too long to relate here. Suffice it to say that

Multi-cell cooling tower showing one forced draft fan in action, two others idle. Fan power is conserved by regulating number in service according to atmospheric conditions and amount of cooling required.

Flexibility in Cooling Towers

Low-head, mechanical draft cooling towers effect economy in space, in material and in cost of operation. The above photograph was taken during full operating conditions at a time when the running of one fan out of three was sufficient to provide the cooling effect required for process operations. Under adverse weather conditions and maximum load on the tower, all fans would be run. The pitch of fan blades is adjustable, thus providing additional flexibility between winter and summer conditions, with corresponding saving in fan power.

Because of their compact construction, and independence of wind conditions, Foster Wheeler low head towers may be placed at any convenient location in a refinery. This materially reduces the piping, foundation, and other installation costs.

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metering has proved its own worth and will be used more extensively in the future. There has been a remarkable improvement in the methods and practices used for pipe-line maintenance. The revolutionary change, during this period, in the methods (especially welding) and equipment for the construction of lines, is too well known to more than state that it has brought about cheaper and faster construction and also more reliable lines. Outstanding also in the progress of the industry has been the improvement in coating materials and the perfection of equipment for applying coatings in the field.

Higher Pressures

Operating pressures of 1,000 to 2,000 lb. are a reality—not a prophecy. Even though 750 lb. is still considered a normal pressure, soon pressures of 1,000 to 1,200 lb. will become general practice, with higher pressures up to 2,000 lb. being used to meet special operating conditions. There may be other pipe lines operating at pressures as high as 1,200 lb., but the author's knowledge is limited to the designs and operations with which he has had every-day contact, and concerning which he has direct and reliable information. The Utah Oil Refining Co.'s 8-in. line from Fort Laramie, Wyo., to Salt Lake City, Utah, constructed in the latter part of 1939, was, on account of unknown factors in its operation, designed for high-pressure service. During the past 2 years, the practicability and the advantages of high-pressure designs have been proved by the operations on this line. Although the volume at the present time is only 8,000 to 10,000 bbl. daily, the temperature of the oil is low and the viscosity is high during the winter months. Also, high-viscosity crudes are batched through the system. The pumping distances between stations are 100 to 200 miles. Fort Laramie, the initial station, having an elevation rise of 3,000 ft. in the first 50 miles, pumps over the Laramie Range to Medicine Bow, a distance of 95 miles, without an intermediate relay station. Its pumping rate is only 6,000 to 7,000 bbl. daily; otherwise, the operating conditions are very unusual, especially during the cold months of the year. The operating pressures range from 1,100 lb. in the summer months to 1,450, and occasionally as high as 1,600 lb. in the winter months. In the batching of La Barge crude, Granger station will operate up to pressures as high as 1,200 lb. For nearly 2 months last winter, Opal station, pumping La Barge crude through 27 miles of 4-in. tributary line, operated day in and day out at pressures between 1,650 and 2,000 lb. with an average of 1,850 lb. The higher pressures at either Medicine Bow or Granger station are used also to speed up the movement, after batching operations or shutdowns. Because the facilities have been designed for this type of service, all of these higher-pressure operations have proved satisfactory and have been carried out free of trouble or failures. This line, believed to be the first designed for and operating at such high pressures, is the prototype of other new systems that can be expected in the future.

Mention should be made also of an 8-in. gasoline line, in service since the latter part of 1939. One initial station, operating normally at 1,000 lb., is capable at pressures of 1,100 to 1,200 lb. of pumping 16,000 to 17,000 bbl. of gasoline daily the entire distance of 171 miles.

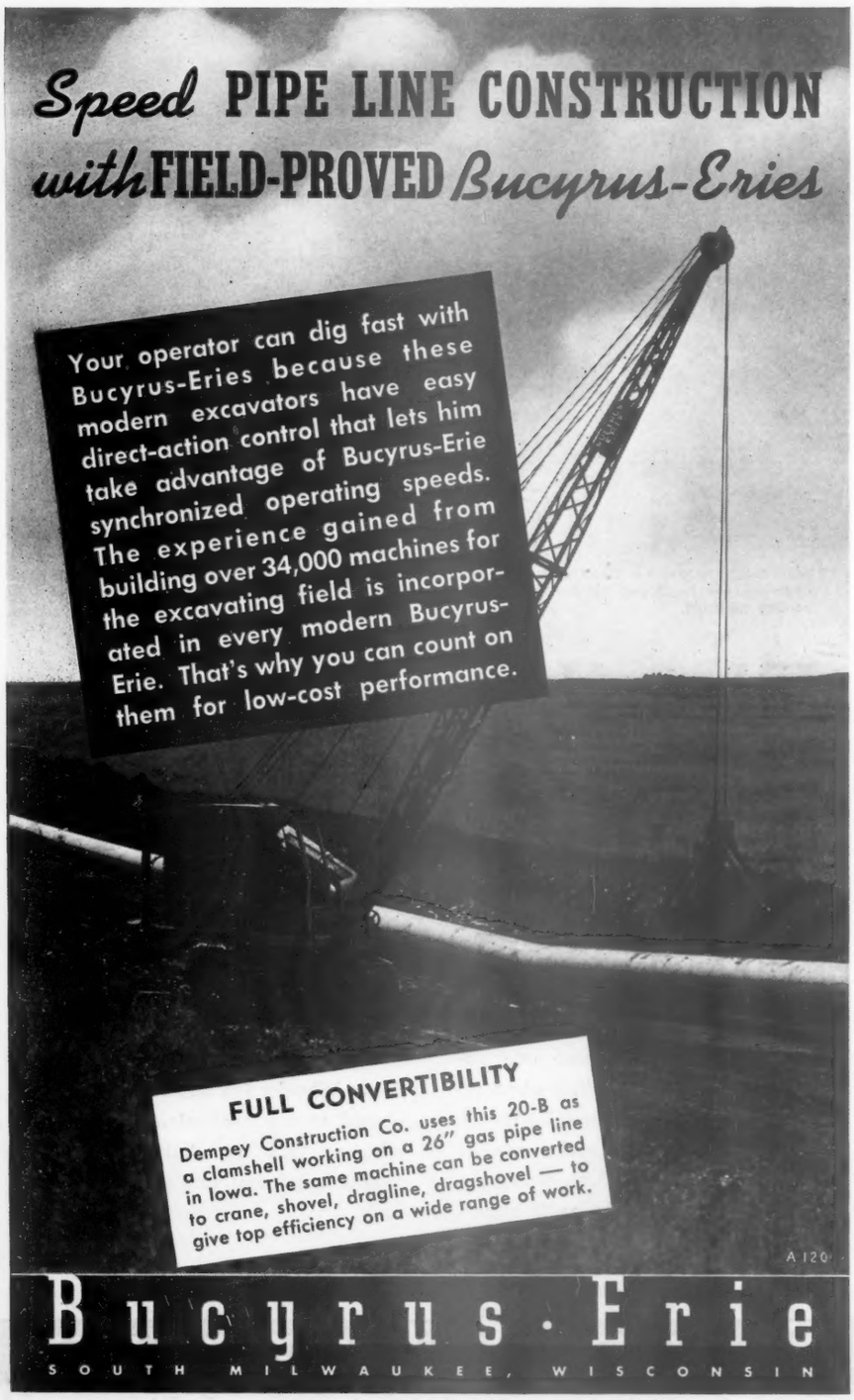
Provision for High-Pressure Operation

Recently, a major company made revisions in its pumps, the station manifold and discharge piping at two of its smaller trunk-line stations preparatory to operating these stations at 1,000-lb. pressure. This plan was followed, rather than building loops between the stations 50 miles apart to provide the additional capacity needed. The same company will install on a tributary 10-in. line later this year a station designed for regular 1,200-lb. operating pressure.

The advantages in higher pressures will be found in fewer pumping stations; greater distances between stations for given capacities; reserve capacity in pumping equipment, rather than in line pipe for meeting temporary peak loads, and making up lost time due to shutdowns for emergencies and repairs; increasing capacities through existing lines (suitable for the higher pressures), rather than laying pipe to take care of additional business, the permanence of which may be uncertain; maintaining line capacities through the winter months; providing for more shutdown time for repairing lines; permitting more flexibility in operations and dispatching oil; handling crude oils considered too viscous to pump under present practices; pumping oils that now require heating; and handling the increasing production from newly developed areas as long as possible before building additional line capacity or installing intermediate relay stations on the tributary line connecting with the trunk-line system. Other unforeseen advantages will undoubtedly be found in the application.

It should be explained before leaving this subject that high-pressure operations can be carried on safely, provided suitable materials, equipment and designs are used. Under these conditions, the higher-pressure equipment is just as safe and reliable as that customarily used for lower-pressure operations—and more so than some of the obsolete pumping equipment and station discharge and manifold piping operating at 600 to 800-lb. pressure.

The author recognizes the economical limitations in the use of higher pressures for overcoming the V^2 loss, which increases rapidly above certain velocities for the respective sizes of pipe; but the advantageous use of the higher pressures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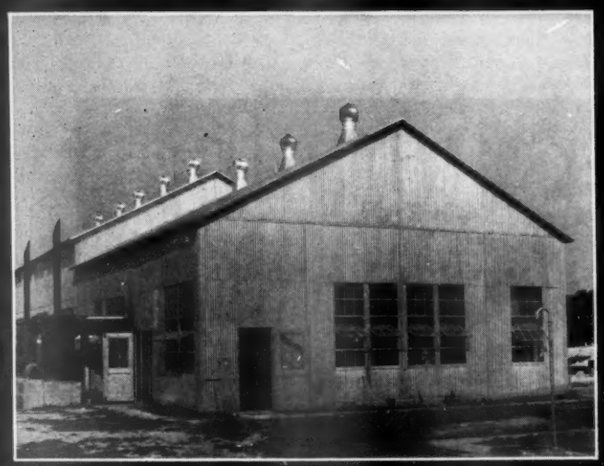

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THE illustrations show BRADEN Buildings recently erected to serve as pumping stations for a pipe line in the Illinois area.

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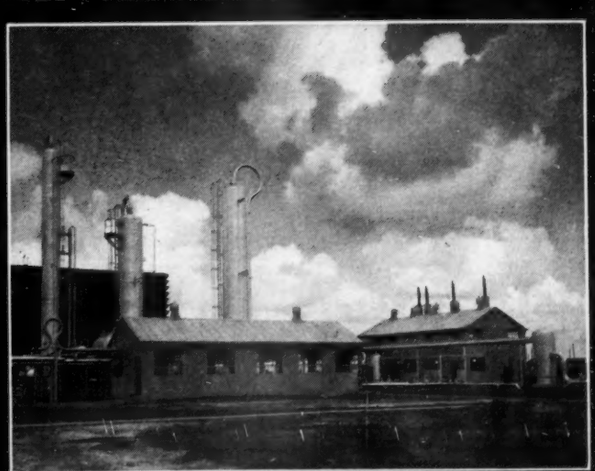

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Construction is simple, rugged and effective, possessing many exclusive, patented features and special advantages.

A. Series of cylindrical rectifying chambers of scientific diameter to length ratio which smooths out sound waves.
B. Dry Feltex Filtering Medium 99.8% efficient by University of California Laboratory tests.
C. Radial Fin Construction. Permits large area of filtering medium to occupy smallest possible space.
D. Rigid, galvanized mesh frame.
E. Reinforcing tube. The Model DS Protectomotor is "built like a battleship."

MODEL D INTAKE FILTER (Left) extensively used on intake of engines and compressors where noise elimination is not important. Same construction as Model DS except for silencing features.

SLIGHTEST TRACES OF OIL REMOVED FROM AIR TRANSMISSION LINES WITH LATEST PROTECTOMOTOR, MODEL AAPHS PIPE LINE FILTER. Staynew engineers have designed an entirely new type of pipe line filter, now used exclusively for the protection of delicate air-powered control devices. This new filter, the Model AAPHS prevents passage of the most minute traces of vaporized oil. The AAPHS is actually a "super" filter, used in most applications as the final of two or more stages of filtration.
Construction Features: (1) inlet; (2) baffle; (3) Solid Feltex Discs through which all air must pass; (4) carrier tube; (5) outlet; (6) shell; (7) drain cock.

referred to above does not come in that category.

On account of the smaller sizes of pipe—6, 8 and 10-in.—used in the construction of the older pipeline systems, because of a limited operating pressure of 750 lb. and due to the risk of large oil losses through separation of threaded joints, or splits in the lapweld, the conventional practice of the industry was to space stations 35 to 50 miles apart. With the advent of seamless and electrically welded pipe, and through the use of substantial protective coatings on the pipe, oil losses are practically eliminated. This type of construction, combined with the use of larger-diameter pipe and much higher operating pressures, paves the way for increasing the distance between pumping stations from an average of 40 to 60 miles or more. This practice is already in effect on some recently constructed lines. For example, on the Utah Oil Refining Co.'s system, Fort Laramie station, operating against an elevation pressure of 1,080 lb., pumps through 95 miles of line to Medicine Bow station, which after picking up additional oil at this point pumps to Granger station—a distance of 206 miles, and Granger station relays the stream by pumping the final distance of 141 miles to Salt Lake City. Reference was made to a case, in the previous discussion of higher pressures, in which the initial pumping station, operating at 1,100 to 1,200 lb., pumps without a relay 16,000 to 17,000 bbl. of gasoline daily through the entire distance of 171 miles. A 12-in. line, 163.5 miles long, constructed recently as a delivery line between a trunk-line station and a refinery point, has only the initial trunk-line station—no intermediate relay stations. At moderate pressure, the capacity of the line is approximately 28,000 bbl. daily. Other examples could be cited as proof of the trend to longer-distance pumping; however, they are similar to the references made above.

Through the use of orifice and displacement meters which provide a reliable check against oil losses, there are quite a few examples of longer-distance pumping, 100 to 200 miles, through old screw-joint lapweld lines without intermediate relays. Of course, this type of operation is permissible only when such lines are not at full capacity. Such longer-distance pumping effects important economies by eliminating the operation of intermediate relay stations pumping at abnormally low pressures.

The competitive advantage of longer-distance pumping on newly constructed lines will in due course of time require a revision of the older systems to adapt them to greater distance between pumping stations, increasing the present distance from an average of 40 miles to distances of 70 to 80 miles. Such a change in the older systems, eliminating every other station, will be accomplished by higher-operating pressures and replacing the smaller sizes of obsolete lines with diameters of pipe ranging between 12 and 16-in., inclusive. Logically, such an evolutionary change will occur gradually and one or two decades will be required to effect it.

Larger Diameters

The use of pipe 16 to 24 in. in diameter for the new National Defense pipe line, which has been under consideration, is indicative of the trend to diameters of pipe larger than 12-in. for newly constructed lines. Although short sections of 14 and 16-in. pipe had been laid previously, the long 16-in. line, laid by the Gulf Oil Co. in Venezuela in 1939, was the beginning of changing over from the smaller to larger-diameter pipe for trunk-line service. Under normal circumstances, pipe sizes as large as 24-in. cannot be justified for long lines. First, because ordinarily the capacity of such a line would be much greater than the quantity of oil that could be pooled for transportation through one system, and second, because such a line lacks the flexibility of operations found in a system of smaller parallel lines, and finally, because it is difficult to pool the ownership and economic risk of a large system among a large number of companies. Although the 24-in. line planned for the new defense project is being used as a matter of necessity, and for economical reasons, this project clearly indicates a change in practice with respect to diameters of pipe for crude-oil trunk-line service. Except for the smaller volumes, 8 and 10-in. pipe will be used to a lesser extent, and at the same time 12, 14 and 16-in. pipe will find greater use for trunk-line service, either as new facilities or as loops, and replacements in the modernization of present systems.

Because of the large-diameter pipe, this project is extremely interesting, theoretically and practically. Interesting from the economic, construction and operating viewpoints, because this project will provide new data and experience, in both construction and operation. Apparently, the designers of this line have selected the large-diameter pipe to conserve steel, and to keep the cost to a minimum. In other words, the design is based on a maximum capacity per ton of steel, and as a corollary, the minimum cost per barrel of capacity. Shortage of steel, badly needed for primary defense, and the economic risk of this emergency project, make these two factors of paramount importance in the design; otherwise, the executives and engineers steering this project would not have taken the risk of plunging into such deep water without previous experience in the construction and operation of such large-diameter crude-oil lines—especially in view of the nature and importance of the project. With this thought in mind, the following tables have been prepared to show an interesting comparison between barrels of capacity, the tonnage of steel per mile of line, and the ratio of barrels of capacity per ton of steel, also the tons of steel per barrel of capacity for various

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CHAMPION Pipe Couplings supply these features: Positively sealed connections that withstand fluctuating hydrostatic pressures up to 4,000 pounds and hold a vacuum.

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size lines and groups of lines. Since we are more accustomed to thinking in terms of the smaller capacities, the comparisons for the smaller lines are included. The figures in Table 1 are based on stations at distances of 60 miles apart, operating at 1,000-lb. pressure, handling 37° A.P.I., 75 S.S.U. crude oil. The working stress of the pipe was figured at 18,000 lb. maximum.

Table 2 shows the same data for 20 and 24-in. lines. These latter figures are based on $\frac{7}{16}$-in. wall thickness for the 20 and 24-in. pipe, representative of the sizes of pipe which, it is understood, will be specified for this line. The capacities are based on 750 lb., the pressure generally reported to be used. The same gravity and viscosity are used for the computations in both tables.

Offsetting the advantages of a minimum quantity of steel per barrel of capacity and a maximum capacity per ton of steel are the following disadvantages. Of first importance is the risk of not having had any previous experience in the construction or operation of such large-diameter crude-oil lines. Having all the capacity of a system in a single line is a distinct disadvantage, especially when the capacity amounts to 200,000 to 300,000 bbl. per day, because a line failure and shutdowns for pressure drops would cause a large loss in daily pumpings. If at some time in the future the pumpings become appreciably less than the capacity of the line, it will be much more difficult to adjust the economics to the changed conditions than would be the case of a system with two or more lines, which could be adjusted by taking a part of the system out of service, reclaiming one or more of the lines, or using the lines for different products. A single large-diameter line lacks the flexibility of operations and dispatching found in a multiple system of lines. The batching of different grades of oil is made much easier through the use of multiple lines. In case of line failures, the drainage losses and the concomitant damage is much greater in the larger lines, and especially so for diameters of 24 in. Without previous experience, it is not known what problems might be encountered in the accumulation of paraffin on the walls of the pipe. On account of the large surface of a 20 or 24-in. line, comparatively heavy loads of paraffin accumulations per foot of pipe should be anticipated.* At the same time, some difficulties in running scrapers should be expected. Water-hammer effect might be experienced, due to the momentum of a larger volume and comparatively high-velocity stream, when sudden changes in rate of flow occur.

In the construction of the line the principal disadvantage of such large-diameter pipe is that it cannot be cold-bent by field methods, and consequently it is necessary to resort to the use of hot field bending or short section factory bends which is a tedious and cumbersome procedure, compared with the field bending methods used customarily for the construction of crude-oil lines. Not only the cost, but obtaining fittings and valves suitable for 20 and 24-in. lines is a disadvantage to such large lines.

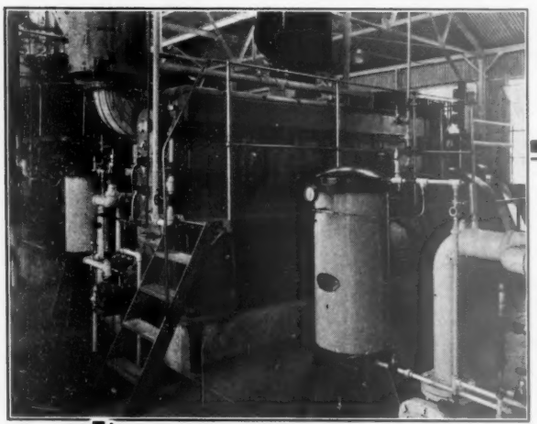
Although the experience in solid-welding 24-in. lines is limited, theoretically the welded joints should be just as strong as those in the smaller lines, which have proved their reliability; the principal question is whether the strains of contracting forces can be distributed as well in 20 and 24-in. lines as in the smaller sizes, especially those in which long-radius field bends can be made. A shortage of steel plates may be a hindrance to the production of this large diameter pipe. In the case of 16-in. pipe, a larger amount of this size could be manufactured by the seamless process, which would require fewer plates than if most of the pipe is manufactured by the electrical welding process. In view of the limited experience and from the practical consideration, the author

TABLE 1—CAPACITIES FOR VARIOUS SIZES OF LINES, SINGLE AND GROUPED

Size of line (or lines)—	Bbl. per 24 hours	Tons of steel one mile	60 miles between stations— Bbl. capacity per ton steel	60 miles between stations— Steel per bbl. capacity (tons)
8-in.	20,040	66.15	5.05	0.1981
10	27,200	83.02	7.47	.1339
12	61,440	101.32	10.11	.0989
14	79,440	115.35	11.48	.0871
16	118,320	148.50	13.28	.0753
12-12	122,880	202.63	10.11	.0989
18	161,160	176.35	15.23	.0657
12-16	179,760	249.82	11.99	.0834
12-12-12	184,320	303.95	10.11	.0989
12-18	222,600	277.67	13.36	.0748
16-16	236,640	297.00	13.28	.0753
12-16-16	298,080	398.32	12.47	.0802
18-18	322,320	352.70	15.23	.0657

TABLE 2

Size of line—	Bbl. per 24 hours	Tons of steel one mile	Bbl. capacity per ton steel (60 miles between stations)	Tons of steel per bbl. cap. (60 miles between stations)
20-in.	185,280	241.30	12.80	0.0781
24-in.	310,000	290.64	17.77	.0562



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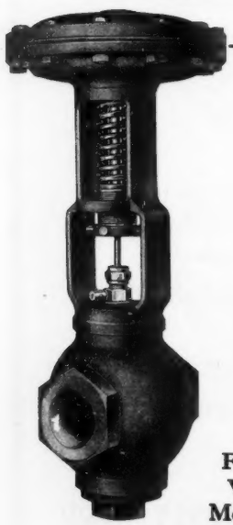

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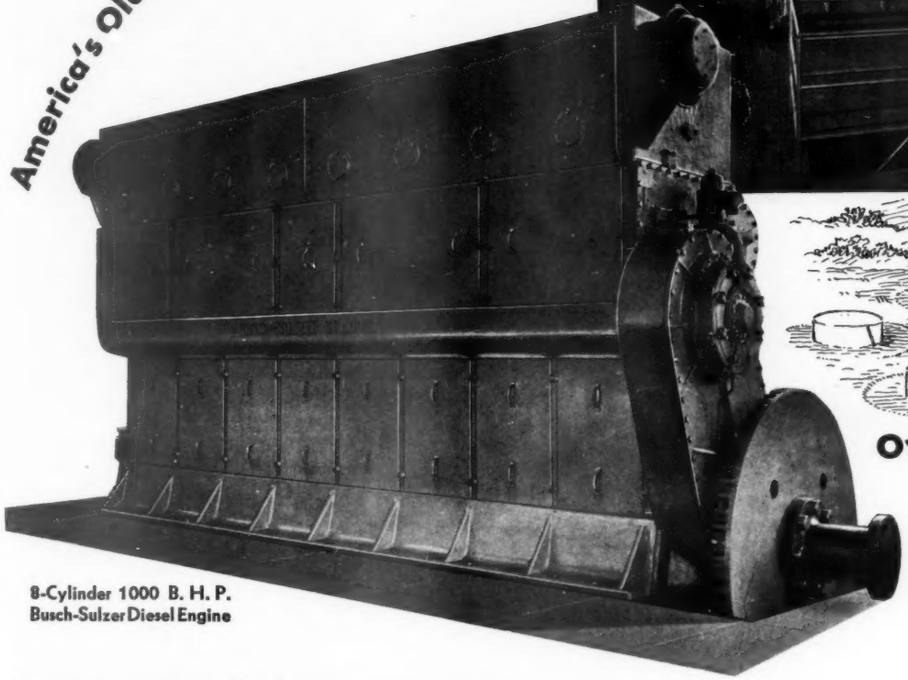

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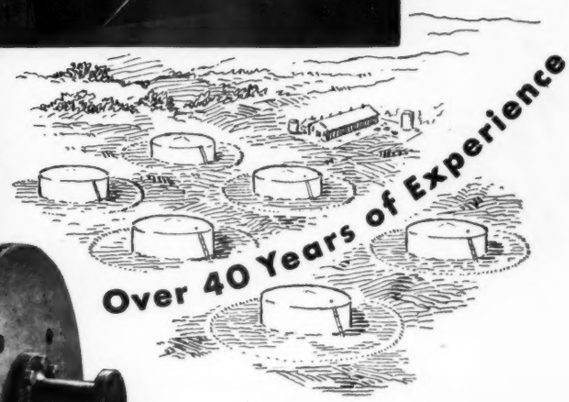

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Maybe there's little need to tell you about this engine that is built by America's oldest builder in the Diesel field . . . an engine that represents a great deal more than an engineer's blueprint—a worker's skill.

Perhaps you yourself can go back fifteen, twenty or more years when Busch-Sulzer's experience was only half that which it is today—can talk about this Busch-Sulzer Diesel and that... pipe line engines that were operating with the utmost efficiency then . . . the very same engines that are still giving top-notch performance today.

Another big advantage is always yours—the fact that you are located within quick service distance of the large modern Busch-Sulzer Works in St. Louis. Orders for parts are handled in minimum time. Maintenance costs remain low.

Of the large number of Busch-Sulzer engines now operating along the pipe lines, 82 already have given fifteen or more years of dependable service.

SIZES UP TO 3600 B.H.P.
IN REGULAR PRODUCTION

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believes 16-in. pipe is more suitable than larger sizes for crude-oil pipe lines.

Modernizing Old Systems

Logically, a modernization program cannot be carried out by junking the old facilities, principally pipe and machinery, in wholesale fashion. It must be done gradually by fitting the new with the old, adapting old facilities to new methods, modernizing in every consistent way old equipment through the use of better materials and the application of new principles, reclaiming such materials as can be used again and disposing of equipment or materials that have no further value in the operations. A statement of some practical examples in the modernization plan of one major pipe-line company will serve to explain the program in more detail.

Consider first the diesel engines and pumping equipment which represent a large part of the machinery of pipe-line systems. Since the pipe-line companies were some of the first, and perhaps the largest users of diesel engines in this country, various older types of diesel engines, also pumping equipment, are found in pipe-line pumping stations. A few pipe lines still use steam boilers, engines and pumps, but generally the prime mover in the pipe-line industry is the diesel engine. In a period of 25 years, representing the more recent history of the pipe-line industry, improvements in pumps and diesel engines have brought about considerable obsolescence in this equipment. After an engine or pump has been in service for 15 or 20 years, wear and tear require replacement of major parts. Consider two examples, including both wear and obsolescence, which afforded an opportunity to modernize the equipment at a small additional cost. One pertains to an engine and the other to a pump. The former, a compressor cylinder without a liner (on an air-injection engine) worn so badly after 20 years' service that it must be replaced, and the latter a pinion and master gear requiring replacement after a similar period of service. The examples are interesting because identical parts having an equivalent amount of service in other pumps and engines are worn and must be replaced also in due course of time.

Ordinarily, a part identically the same in design and quality would be supplied as a replacement and obsolescence would be perpetuated. When such replacements become necessary, careful consideration should be given to modernizing the equipment, either by complete elimination of or replacing obsolete members with parts designed more suitably to adapt the engine or pump to modern practices. The problem is interesting, and I hope the reader will bear with the author in relating more details.

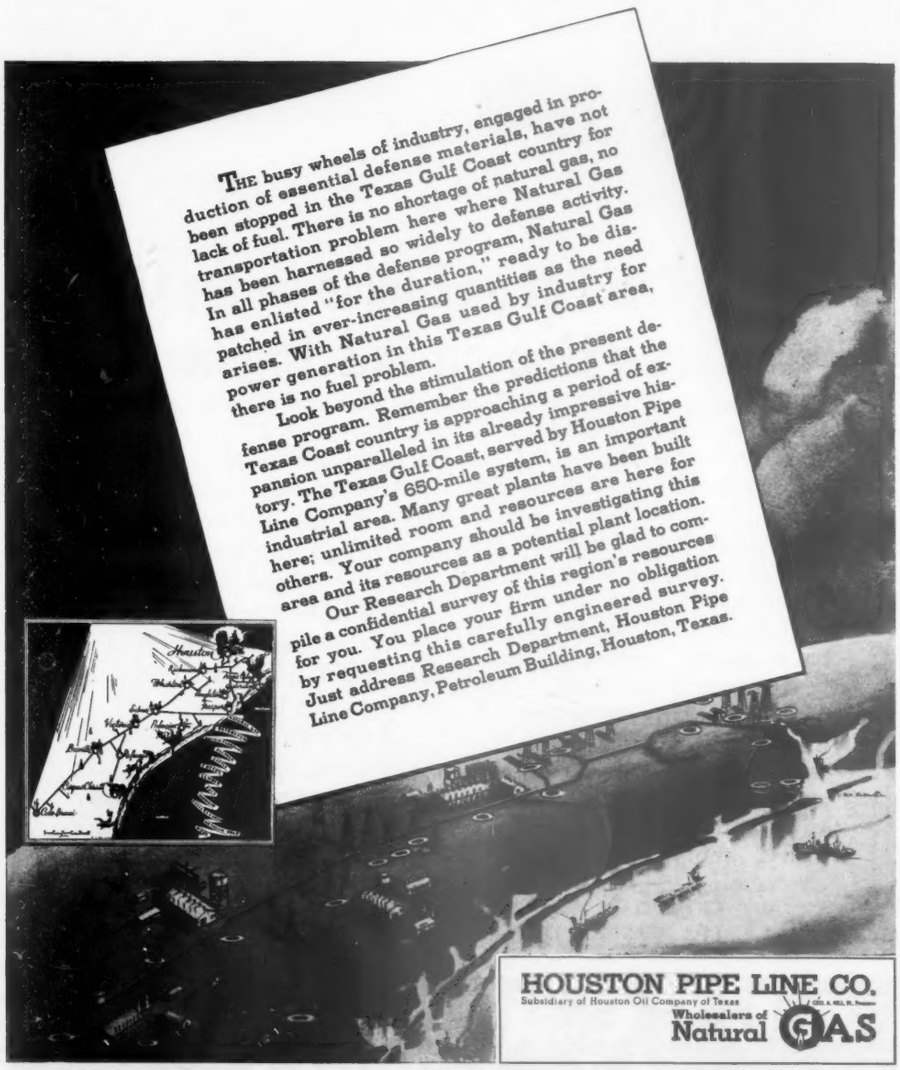
Justification of Change

In the case of the compressor cylinder, referred to above, the air compressor, injection bottles, intercoolers, and air piping will be eliminated entirely by converting the air-injection engine to solid-fuel injection. At best, on account of explosions, compressors and air-injection systems on diesel engines are dangerous; also, they are a constant source of trouble in operations; and they are difficult to maintain. For these reasons alone, the change is justified especially when the replacement cost of a newly designed compressor is nearly the cost of the equipment required to change over from air to solid injection. But other benefits and advantages are gained by the change. First, a gain of 8 per cent, approximately 40 hp., in the capacity of the engine, which when appraised at a value based on installed pumping capacity, is more than adequate to pay for the change. A better fuel economy is effected, sufficient alone to pay out the cost on the conversion in 4 years. The change will also eliminate the troubles experienced in air compressors, intercoolers and the new injection system will avoid much of the shutdown time, and make for more continuous and reliable operation. And there will be less maintenance expense. This proof is adequate to justify this change, but there is another important reason for and advantage in it. A plan for increasing the speed of the engine, referred to below, from 225 to 277 revolutions, required, as a preliminary step, the elimination of the air compressor, which was not suitable for the increased speed.

The latter example pertains to a worn pinion and master gear in a 32,000-bbl., 47-r.p.m., horizontal triplex pump which must be replaced. The same type of gears will not be used. Instead, a replacement suitable for increasing the capacity of the pump will be provided. Gears designed for a lower gear ratio, to increase the speed to 60 r.p.m. and having greater tooth strength to take care of an additional load planned for the pump, will be supplied. In this particular pump, although there was reserve strength in the frame to take an additional load, a limitation on the plunger sizes made it necessary to obtain the desired additional capacity by increasing the speed of the pump. The newly designed gears, in this case, will serve the triple purpose of supplying a necessary replacement, providing the additional capacity referred to again later, and modernizing the pump.

Another interesting example pertaining to the same pump is found in the replacement of defective cast-iron fluid ends which on account of repeated failures have been not only troublesome, but also hazardous. Until recent years, cast-iron cylinders, identically the same, were used for replacements when failures occurred. But now, forged-steel cylinders, designed for fewer and better valves, larger plungers, and pressures up to 1,500 lb. are supplied as replacements. Incidentally, the valve covers and the flanged discharge openings are designed also for high-pressure operations by the use of ring-joint. Through this

Natural Gas on the Texas Coast has enlisted "For the Duration"


THE busy wheels of industry, engaged in production of essential defense materials, have not been stopped in the Texas Gulf Coast country for lack of fuel. There is no shortage of natural gas, no transportation problem here where Natural Gas has been harnessed so widely to defense activity. In all phases of the defense program, Natural Gas has enlisted "for the duration," ready to be dispatched in ever-increasing quantities as the need arises. With Natural Gas used by industry for power generation in this Texas Gulf Coast area, there is no fuel problem.
Look beyond the stimulation of the present defense program. Remember the predictions that the Texas Coast country is approaching a period of expansion unparalleled in its already impressive history. The Texas Gulf Coast, served by Houston Pipe Line Company's 650-mile system, is an important industrial area. Many great plants have been built here; unlimited room and resources are here for others. Your company should be investigating this area and its resources as a potential plant location. Our Research Department will be glad to compile a confidential survey of this region's resources for you. You place your firm under no obligation by requesting this carefully engineered survey. Just address Research Department, Houston Pipe Line Company, Petroleum Building, Houston, Texas.
HOUSTON PIPE LINE CO.
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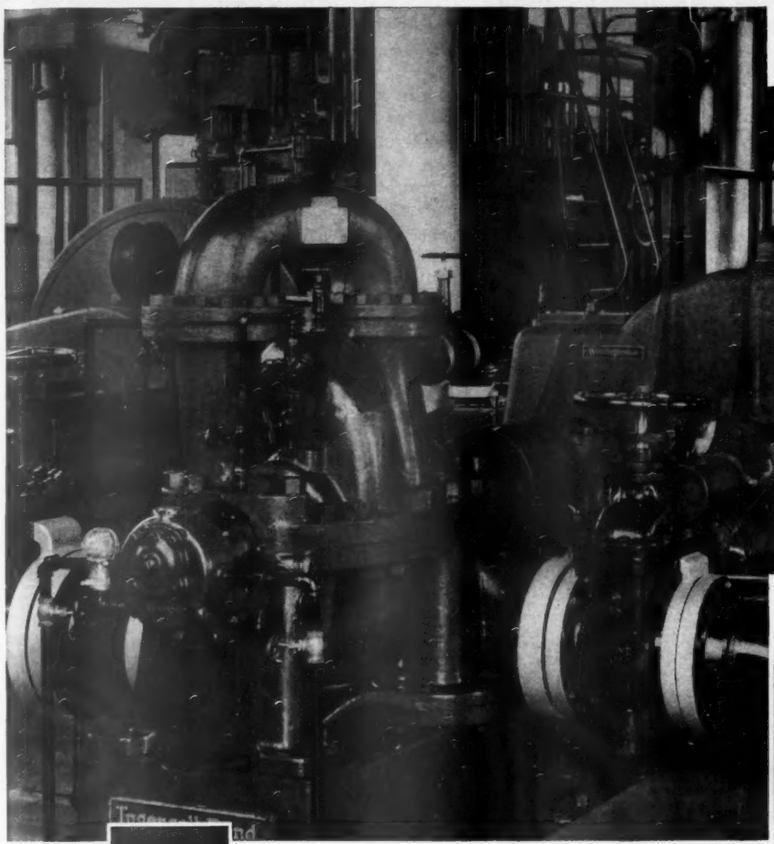
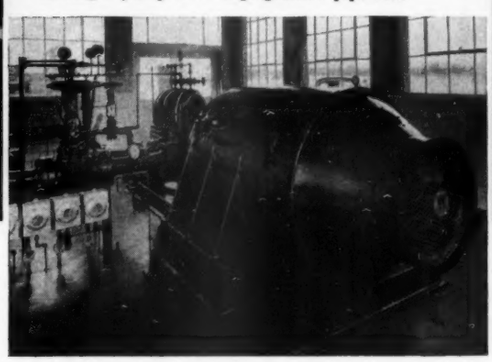
WESTINGHOUSE DEVELOPMENTS SPEED PRODUCTION



Westinghouse Type SU-24 Speed Increaser coupled to pipe line pump and Diesel engine at a large Midwest pipe line pumping station.

600 hp explosion resisting Westinghouse motor driving a pump on a large gasoline pipe line.



Tailor-made . . . for pipe line service

LOOK TO WESTINGHOUSE FOR LATEST DEVELOPMENTS IN THIS EQUIPMENT:

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Included in the list of "tailor-made" Westinghouse equipment for the petroleum industry is the high speed geared drive. Each of these speed-increaser units is matched to the characteristics of its engine drive and couplings so as to avoid critical speeds and resonant vibration conditions. And with the integral Westinghouse forced-feed lubrication system, outstanding performance and long life are assured.

The explosion resisting motor in sizes up to 1000 hp is another example of our engineers' ability to design equipment for unusual service conditions. These motors for hazardous locations are the first of the self-contained heat-exchanger type ever to be built in ratings over 500 hp. And the time-tested dual ventilated Westinghouse frame has replaced other methods of motor ventilation so completely that it has now become an industry standard.

Building equipment with a reputation for unsurpassed quality is the result of constant study of the petroleum industry's needs on the part of our engineers. You'll find it pays dividends in safety, economy and trouble-free maintenance to use Westinghouse equipment.

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J-94456

TIME-SAVER FOR THE PETROLEUM INDUSTRY

change and by the replacement of the gears referred to above, the capacity of the pump will be increased to nearly 58,000 bbl. for 700 lb. pressure, or a correspondingly reduced capacity for 1,200 lb. pressure. The adaptability of the pump for either large volume at moderate pressures or a lower capacity at high pressure will prove to be valuable in future operations.

But in what manner will sufficient horsepower be provided in the 500-hp. engine now connected to this pump for meeting the increased capacity of the pump? By three methods, each representing important examples of modernization—first, converting the engine from air to solid injection as explained previously; next, increasing the speed from 225 to 277 r.p.m.; and finally, by supercharging. Forty horsepower will be gained by converting to solid-injection fuel system, 115 hp. will be added by increasing the speed, and finally the supercharging will develop another 327 hp., making a total of 980, nearly doubling the capacity of the engine. It is estimated conservatively that the conversion from air to solid injection, discussed previously, will effect an increase of 8 per cent in horsepower; there is no question about the increased horsepower gained by the additional speed; and the use of supercharging for obtaining a 50 per cent increase in horsepower and its practicability has been proved by actual operations. In increasing the speeds due consideration has been given to "criticals." The details pertinent to these conversions in the engines and the application of supercharging are interesting, but cannot be discussed here; it suffices to say that their application offers a means of modernizing the machinery.

Other opportunities for modernization, too lengthy to discuss in detail, are found in metering, the more extensive use of instruments, use of pressure on suction systems of trunk-line stations, synchronizing pumpings between stations by controlling the speed of the machinery through the suction pressure on the crude-oil piping system, and the more extensive use of portable pumping equipment for field-gathering service.

On account of the materials and equipment used and by the nature of their construction, the type of field-gathering system built as recently as 10 years ago is almost wholly obsolete and very little can be done to modernize such facilities. In most cases, it would be economical to make a simple installation of new equipment (a portable-type multicylinder engine and a piston-type pump) and dismantle the old facilities for salvage, junk, or sale as secondhand equipment.

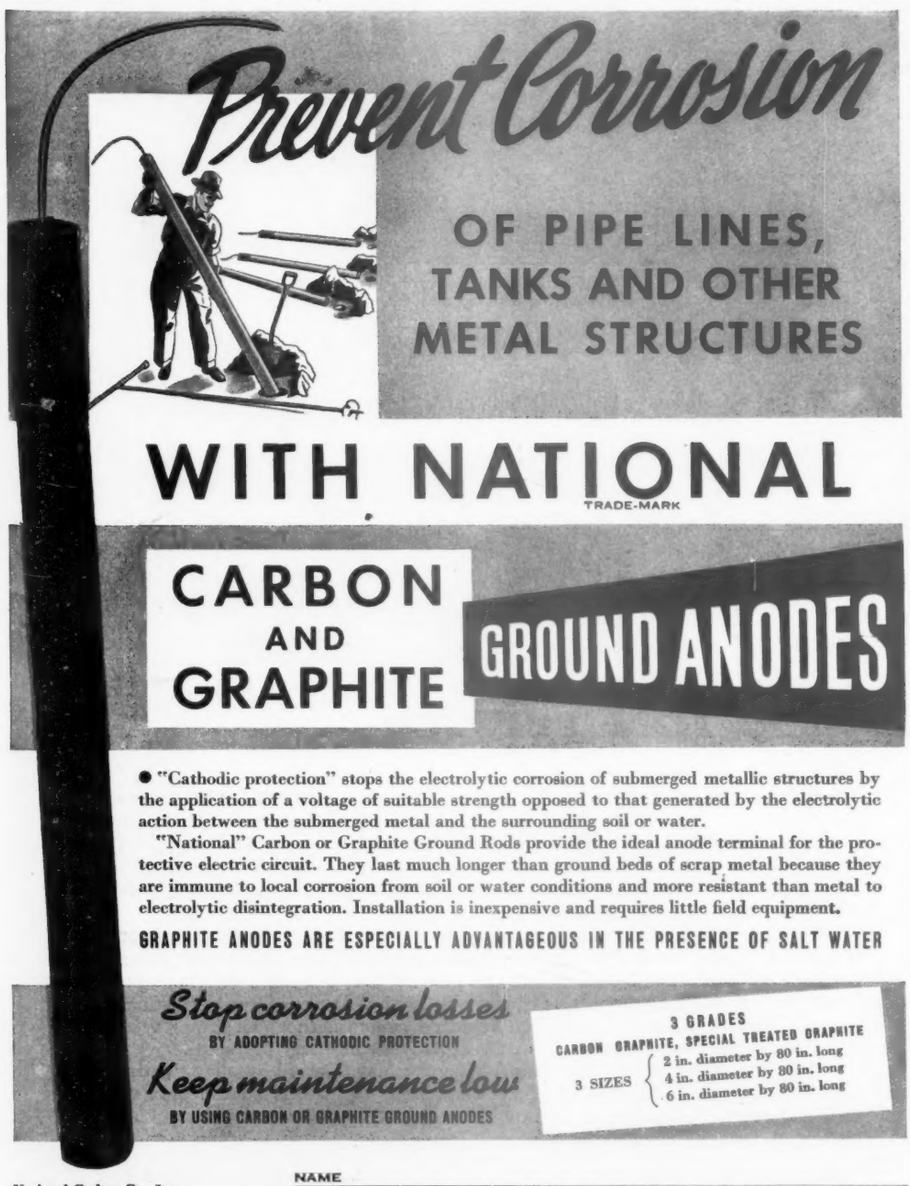
The modernization of the trunk pipe lines can be accomplished by replacing the bare, screw joint, 20-ft. lapweld pipe, especially the sizes below 12-in., with an equivalent capacity in modern coated lines, represented by sizes from 12 to 16 in., inclusive. Usually, the 6, 8, and 10-in. pipe that might be reclaimed from trunk lines can be used for construction of new tributary lines. After eliminating the defective material, this secondhand pipe, relaid as welded, coated lines, serves almost as well as new pipe. When used in this manner, the lines should be tested with water pressure to eliminate weak lapwelds or defective pipe. Except for the 12-in. screw pipe, penalized by its weight, opportunities occur for the replacement of the obsolete pipe in trunk lines—principally when larger-diameter pipe can be laid for additional capacity, to replace a group of smaller sizes of parallel lines or to replace bad sections. The economics of such changes vary with conditions and each case must stand on its own merit. The subject is too involved to discuss in detail here; but in the course of the business of most companies, there will be cases in which the changes can be justified from the economic viewpoint. The use of larger-diameter, thinner-wall, higher-tensile-strength pipe makes such a program possible. Incidentally, one major pipe-line company has supplied most of its new requirements for 8-in. pipe from the trunk lines by making such replacements.

On account of the material used and the nature of their construction, most of the discharge piping systems in the manifolds at trunk-line stations, also in many of the intermediate junctions, are not suitable for the higher pressures. Generally, modern practice will require a complete replacement of such facilities, without any appreciable salvage being realized from the old piping.

●

THE COVER

The illustration on the cover page of the Pipe Line Section of this issue shows a tractor moving a section of 10-in. pipe, coated and equipped with river clamps, which was laid by Gulf Refining Co., Tulsa pipe-line division, across the Verdigris River near Broken Arrow, Okla., in the work of completing the first loop laid in the program to enlarge the capacity of the company's crude-oil trunk line between Glenpool, Okla., and Cincinnati, Ohio. The entire undertaking consists of laying more than 200 miles of loops for this project, now under construction, which will increase main-line daily capacity from 43,000 bbl. to 53,000 bbl.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Cost-Accounting Methods in Pipe-Line Construction

By VIRGIL RITTMANN
El Paso Natural Gas Co.

THE accounting work on our pipe-line construction is handled through a branch office, commonly referred to as a construction office. The office is conveniently located near the job site where banking and telephone facilities are available, and close enough to the construction operations to enable the timekeepers and material men to keep in daily communication with the office. The accounting relation of the construction office to the general office in El Paso follows the general principles of accounting employed in an independent branch office. Reciprocal accounts are carried on the books of each office to record the transactions arising out of one office and affecting the other. These transactions are generally confined to cash requirements supplied by the general office and drafts drawn on a local bank covering payments for rights-of-way, which are taken up by the general office.

The voucher system of accounting is followed by the construction office and a complete set of records and accounts are kept, independent of the general office in El Paso. The following books of account and statistical records comprise the construction office records:

Job ledger (cost control ledger).
Cash receipts journal.
Cash disbursement journal.
Voucher register.
Pay roll records.
Job cost record.
Daily cost record.
Daily progress report.

The job ledger, or the general ledger of the construction office, carries accounts adequate to provide for the proper accounting of all expenditures arising out of the construction office. The journals are closed monthly into the job ledger and a trial balance is forwarded to the general office where it is incorporated in the regular monthly financial statement of the company.

The job-cost classification carries a work-order number assigned by the general office and a complete description of the job showing the length of the line, the size of the pipe and the geographical location of the pipe line. Each functional operation on the pipe line carries a separate account in this classification. The cost classification carries the official estimate of each functional operation showing the estimated line cost per foot and the total estimated cost.

Cost-Accounting Setups

The cost-accounting setup on a pipe-line construction job provides for a breakdown of the following operations:

Right-of-way: Cost of easements; cost to acquire easements; damages; surveys.

Transmission line: Pipe; unloading pipe; general paint-yard costs; clean and prime (paint yard); hot coat and wrap (paint yard); whitewash wrapped pipe; clearing right-of-way; machine ditching; rock ditching; hauling and stringing pipe; line up and tack welding; welding; tiein, including bending (on two-third and one-third method only—none on stovepipe method); field patch—hot coat; lowering in; backfill; railroad and highway crossings; "A" frames for spans and concrete anchors through washes; testing and purging line; cleanup.

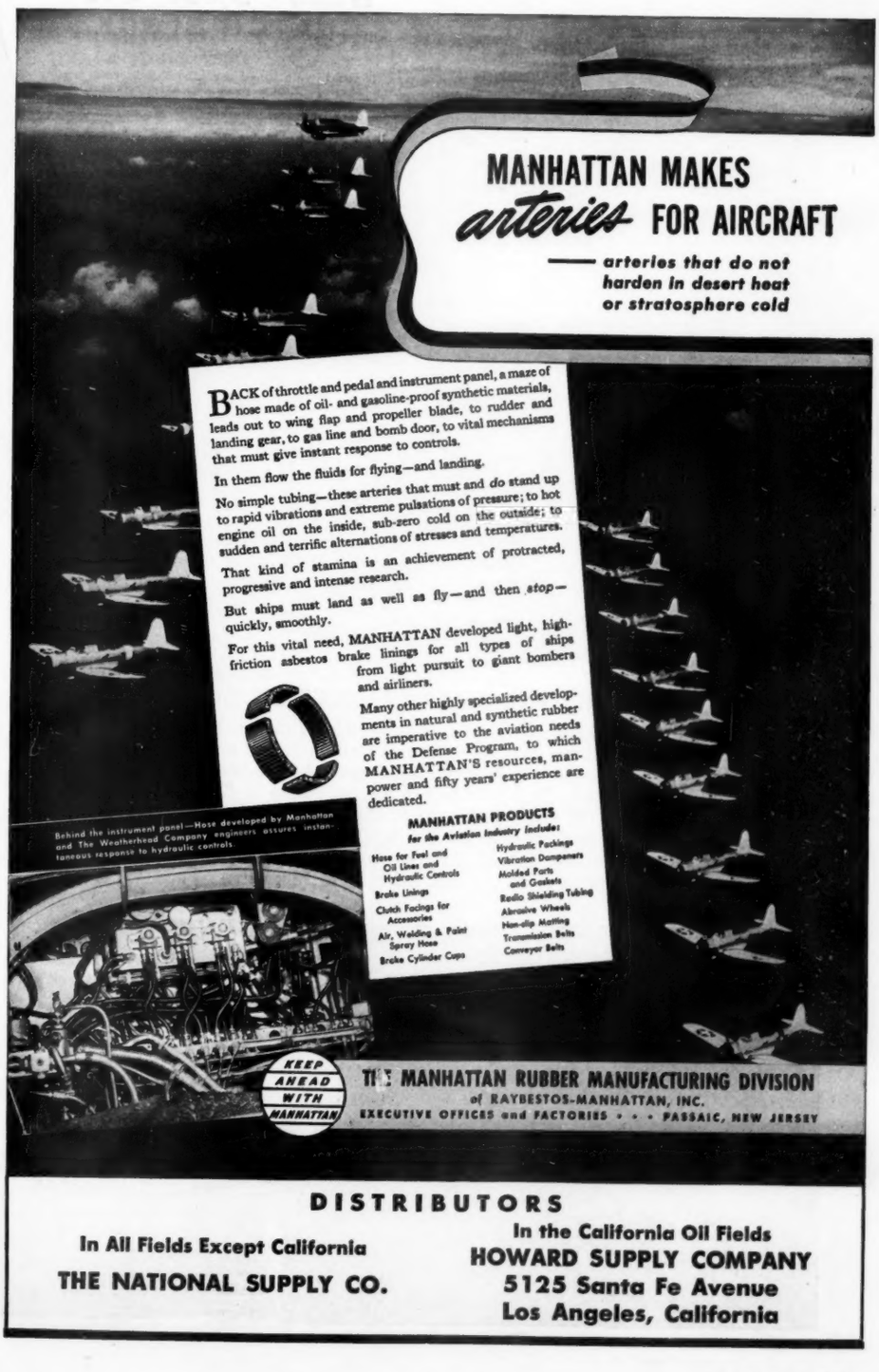
Other transmission-line equipment: Main-line valve assemblies; gate boxes; drips and pipe racks.

Overhead costs and other undistributed items: Field supervision; field-office expenses; undistributed field costs; hauling construction equipment and supplies to and from job; medical expenses; insurance and taxes; repairs to construction equipment at completion of job; depreciation on construction equipment; miscellaneous construction expenditures.

For the purpose of establishing a uniform classification of costs, the construction office is supplied with a "cost classification index" which sets forth in tabular form the various elements of pipe-line construction costs to be classified under the various functional operations as shown in the above cost classification.

Direct Costs

Direct costs include all expenditures for pipe, other materials, labor, supplies and other expenses directly assignable to the various operations grouped under right-of-way, transmission line and other transmission-line equipment. Where special equipment is used, such as tractors, ditching


MANHATTAN MAKES
arteries FOR AIRCRAFT
— arteries that do not harden in desert heat or stratosphere cold
BACK of throttle and pedal and instrument panel, a maze of hose made of oil- and gasoline-proof synthetic materials, leads out to wing flap and propeller blade, to rudder and landing gear, to gas line and bomb door, to vital mechanisms that must give instant response to controls.
In them flow the fluids for flying—and landing.
No simple tubing—these arteries that must and do stand up to rapid vibrations and extreme pulsations of pressure; to hot engine oil on the inside, sub-zero cold on the outside; to sudden and terrific alternations of stresses and temperatures.
That kind of stamina is an achievement of protracted, progressive and intense research.
But ships must land as well as fly—and then stop—quickly, smoothly.
For this vital need, MANHATTAN developed light, high-friction asbestos brake linings for all types of ships from light pursuit to giant bombers and airliners.
Many other highly specialized developments in natural and synthetic rubber are imperative to the aviation needs of the Defense Program, to which MANHATTAN'S resources, manpower and fifty years' experience are dedicated.
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Behind the instrument panel—Hose developed by Manhattan and The Weatherhead Company engineers assures instantaneous response to hydraulic controls.
KEEP AHEAD WITH MANHATTAN
THE MANHATTAN RUBBER MANUFACTURING DIVISION
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"WECO" Helpers for Pipeliners

"WECO" DROP SIDE SNATCH BLOCK

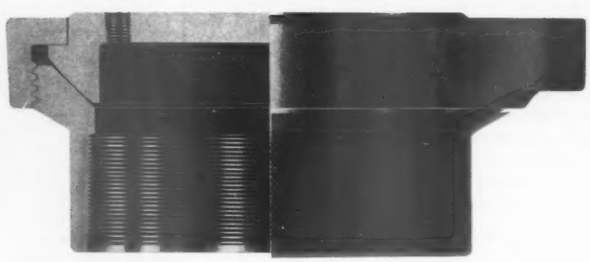
(Patented)

Especially designed for all oil field and pipe line service. Hinge plate, quickly released by wing nut, allows easy threading without necessity of lifting weight of entire block and line. Steel sheave has machined surface groove for line, and is held securely in place when side plate is raised by shoulder on sheave pin. Replaceable bronze bushing.

Alemite fitting countersunk for protection while block is in use. All blocks are equipped with forged steel hooks. Available with sheaves for 5/8" and 7/8" wire line, or 1 1/2" Manila rope. Can be equipped with hooks or clevis, as specified. Prices upon request.

"WECO" EMERGENCY PIPE CLAMP AND SERVICE SADDLE

A patch clamp for stopping leaks in oil, gas, water, steam, etc., lines, especially for repairing split pipe. No bolts, no wrenches needed. One man installs clamp, with ball peen hammer. Adaptable for underground or close work. Resists ground slippage. Made of Certified Malleable Iron (ASTM 4733 Grade 35018). All clamps complete with gaskets. May be used as pipe hanger by installing it upside down. Furnished drilled and tapped for use as service saddle on special order. Prices quoted upon request. Sizes 1" to 12".



"WECO" SCRAPER BOX UNION

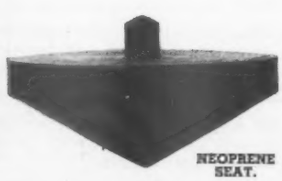
Designed especially for pipe line service. Speeds up operation of running "go-devils" by eliminating the necessity of removing flanges. Extremely light weight. Easily installed and quickly dismantled. Furnished threaded (as shown) or with slip-on sub for welding. 2,000-pound test. Available in 4", 6", 8" and 10" sizes.

"WECO" LEAK CLAMP

(Patented)

A simple, positive leak clamp, for sealing large or small leaks in oil, water and gas lines. Pipe sizes 5" through 24" diameter. Installed in one minute without use of any tools, bolts or nuts. Adjusted to any pipe size by increasing or decreasing number of chain lengths. Neoprene cone seals large leaks. Dummy seat seals pin-hole leaks in places not accessible to the yoke. Prices quoted upon request.

DUMMY YOKE.



NEOPRENE SEAT.

WELL EQUIPMENT MFG. CORP.
HOUSTON, U. S. A.
EXCLUSIVE SUPPLY STORE DISTRIBUTION
Export: R. J. Eiche, 228 43rd St.
Manhattan Beach, Calif.

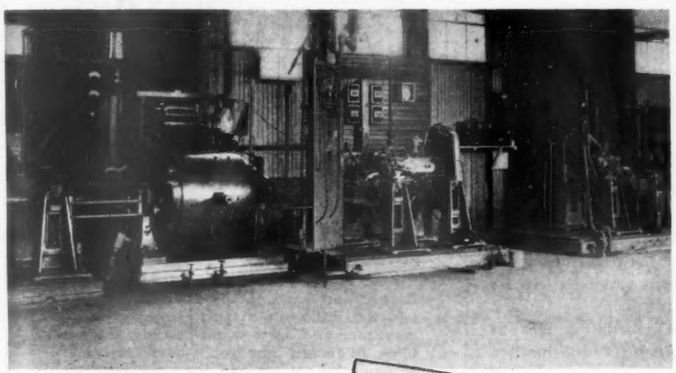
machines, etc., all repair costs while the equipment is operating on the job are charged to that particular operation on which the equipment is used. Operating and repair costs of autos and trucks are similarly charged.

Overhead and other indirect costs generally include only those items shown in the cost classification. On certain jobs the above classification is expanded to include other items of overhead costs, such as, interest during construction, special legal services, taxes, etc. No arbitrary percentages of general office and general administrative expenses are assigned to construction costs. Only the time and expenses of general office employes actually engaged on the construction work are charged to the construction job. Insurance and taxes on the construction pay rolls are accrued by the general office and charged to the construction office monthly. The first cost of all construction equipment is carried in the general equipment property account of the general office and the charge to the construction job for the use of equipment includes the cost of overhauling all equipment and restoring it to first-class operating condition at the completion of the job plus nominal depreciation based on a 3-year life for a term not exceeding the actual period of construction. Where a construction camp is operated, the net profit or loss from the operation of the camp is carried to miscellaneous construction expenditures. In classifying overhead costs at the completion of the job to the primary plant accounts, no distribution of overhead costs to the structural accounts is necessary, since all of the costs are classified as one unit of plant in the company's continuing plant record and to one primary plant account, except the cost of rights-of-way to which no portion of the overhead costs is assigned.

Division of Daily Cost Statement

During the course of the job, the regular routine reports prepared by the construction office include a daily cost statement and a daily progress report. The daily cost statement is divided into three sections, the daily costs, the cumulative costs and the costs to complete the job. The record underlying the daily cost statement is referred to as the memo cost record only for the reason that the items of cost posted into this record do not carry a reference to the cash voucher to support the cost entry. Only actual costs are entered in this record, however, and no estimated costs are used. This record requires a complete daily report on all the operations of the job.

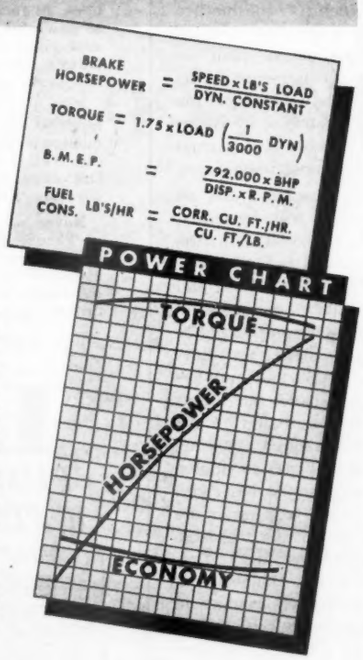
The labor is reported daily on foremen's time cards. A rate schedule is prepared showing the rate applicable to each labor classification on the job. Badges are assigned to all employes when they are hired, and only the badge numbers to identify the employes are reported on the time cards with the number of hours worked and the distribution of the time. Each foreman prepares the time card for his gang, and an independent check of the men on the job is made by a time-checker. The foremen's time cards are delivered to the office daily, after being verified by the time-checker. All labor is entered on a time voucher and distributed daily, and after it is summarized the entry is made in the memo cost record. In order to avoid an abnormal fluctuation of the daily labor cost falling in the latter part of the work week after an employe has worked 40 hours per week and the time-and-a-half rate applies, an average rate is used based on the normal scheduled work week for each gang. Any difference in actual labor costs arising out of the use of this predetermined rate is adjusted at the end of the regular 2-week pay-roll period. In posting to the time voucher, the average rate and the actual rate are extended simultaneously so the voucher is completed in one posting operation. Only the



ENSIGN DYNAMOMETER LABORATORY

Tools to WORK WITH

To take the guess work out of carburetion requires not only a well equipped engine dynamometer laboratory but air and fuel flow devices calibrated to 1/1000 of a unit. Yet, this expensive equipment is utterly useless without trained engineering personnel. • At ENSIGN the engine manufacturer and engine users find an abundance of accurate testing apparatus and a staff of competent engineers. • For 30 years ENSIGN has specialized in carburetor building. Constant research and testing results in the development and application of new and improved principles—those features you enjoy in today's carburetion.


BRAKE HORSEPOWER = SPEED x LB'S LOAD / DYN. CONSTANT
TORQUE = 1.75 x LOAD (1/3000 DYN)
B.M.E.P. = 792,000 x BHP / DISP. x R.P.M.
FUEL CONS. LB'S/HR = CORR. CU. FT./HR. / CU. FT./LB.
POWER CHART
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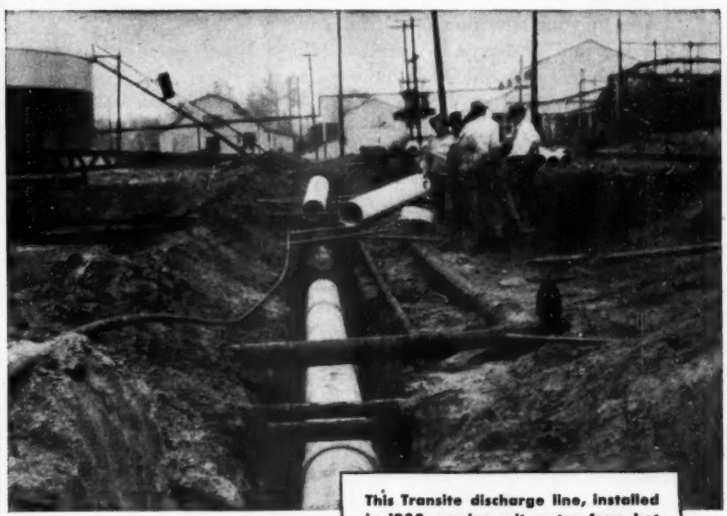


This Transite discharge line, installed in 1938, carries salt water from hot well to cooling tower.

HOW TO CARRY SALT WATER ECONOMICALLY...

MANY leading oil producers have found Transite Pipe the most practical solution to the problem of carrying salt water economically. They have learned that this durable pipe costs less to install and lasts longer with less maintenance. In fact, Transite has proved so satisfactory in this service that many producers are also using it on oil-lead lines.

Made of asbestos and cement, Transite Pipe is strong, durable and corrosion-resistant. The Simplex Couplings form tight joints that *stay* tight . . . protect against crop damage or ground-water pollution. And Transite's long lengths, light weight and simple assembly make installation easy, rapid and economical.

• • •

You should have full details. Write for brochure DS-320. Johns-Manville, 22 East 40th Street, New York, N. Y.

Johns-Manville
TRANSITE PRESSURE PIPE
For Lead Lines and Salt Water Disposal Systems

A STANDARD CHOICE

Ludlow Double-Disc Gate Valves employ the famous principle of gate and wedge construction which Ludlow developed and perfected. Valves embodying this type of construction are particularly suited to motor operation. All danger of jammed gates is eliminated because the wedges release with a minimum amount of energy. This principle also allows free operation throughout the full length of the gate travel, lessening motor wear and power consumption.

Ludlow Valves can be furnished in all standard sizes and types or specially made to your specifications. Write for catalog and prices or we shall gladly recommend and quote on valves for special purposes.

LUDLOW PRINCIPLE

Self - releasing 30° angle wedges and flexible action gates self-adjusting to seats for improved performance, longer life.

Part of a recent shipment of Ludlow Valves for a larger refinery operation.

The LUDLOW VALVE MFG·CO·INC· SINCE 1866 TROY·N·Y·

extension of the average rate, however, is picked up for the daily cost statement.

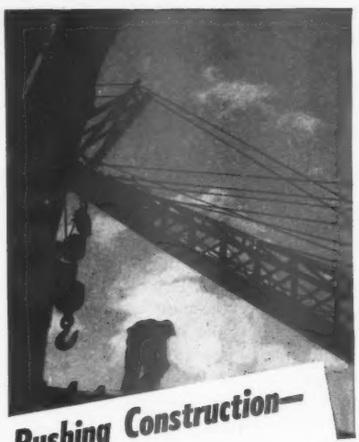
Enamel, primer and thinner used in the paint yard and on the field patch, and welding supplies used on the line are reported daily on the reverse side of the foremen's time cards, and are taken into the costs daily. When these supplies are purchased, they are carried in the job supplies account, and the supplies account is adjusted to an actual physical inventory at the completion of the job.

The costs of the pipe, other materials, small tools and miscellaneous supplies are entered upon receipt of the invoices. In order to avoid distortion of the daily costs, other items of costs not strictly daily costs, such as repairs to equipment, welding equipment replacements, expense accounts and the monthly charges from the general office, are shown on the daily cost statement in an intermediate column between the daily costs and the cumulative costs, and these amounts are added to the daily costs and carried into the cumulative costs. The daily and cumulative progress as shown on the daily progress report is added to the cost statement and the line cost per foot is extended on each operation on the job. By adding these units on each operation on the pipe line, the actual total installation costs of the pipe line may be compared to the daily, the cumulative and the estimated costs, presenting a complete cost picture each day while the construction operations are in progress.

The daily progress report is compiled from the engineering stations reports on the reverse side of the foremen's time cards, and this information is secured by the foremen from numbered survey stakes placed on the right-of-way at the time of the original survey.

The job-cost record is generally referred to as the permanent-cost record to distinguish it from the memo cost record supporting the daily cost statement. This record is posted from the audited cash vouchers and approved journal entries in sufficient detail to clearly identify the nature of the items, and to permit a detailed analysis of the various components of cost in each account in the cost classification. This record forms the connecting link between the source of the original transaction to the total job cost by carrying a reference to each cash voucher and journal entry supporting every item of construction cost.

When a construction job is completed and all the costs have been recorded, a cost statement is prepared from the balances shown in the job-cost record. The cost statement carries a complete description of the job, the date started and the completion date. The cost of each operation on the job is shown on this statement together with a full description of the quantities and units of the principal items of materials and supplies included in the costs of the various operations on the job. The line cost per foot based on the actual length of the line is extended, showing a comparison between the actual and estimated line cost per foot and the total actual cost with the original estimated cost. Any overruns or underruns on the job may then be readily traceable to particular construction operations on the line. The total of this statement ties in to the cost control in the unfinished construction account in the job ledger. Preparatory to closing the account in the construction office, a trial balance is taken from the job ledger and a final entry is made crediting the open balances in the accounts and debiting the reciprocal account with the general office. Concurrent entries are made on the books of the general office in consolidating the accounts of the construction office, applying the total job cost and other open accounts against the reciprocal account, eliminating the construction office account and completing the accounting record of the job.



Rushing Construction—
SPEEDING PRODUCTION

CLATTERING air hammers, roaring bulldozers and clanging well casing noise dins the air throughout the country. Defense projects are being rushed—production is going up,—up—and up! But the entire program is moving on a simple life necessity—Water!

Almost before the first transit is leveled, Layne men are on the job, rigs are up and the drills are biting through soil, clay, rock and on to water bearing formations. In record time you'll hear the hum of powerful motors and the splashing of cool clear water. Such is the tempo of today's unparalleled activity as the Nation faces an unpredictable future.

Keyed to the ever increasing and extremely urgent need for speed in production is Water! And wherever the Pump and Well is of Layne build, there you will find dependable performance no matter how heavy the load or prolonged the run.

Never has the Layne Organization been so keenly alert to its task of producing great quantities of water with utmost speed. Never has it been operating more efficiently. If you need more water to further speed production, write or wire

LAYNE & BOWLER, INC.
Memphis, Tenn.

LAYNE
PUMPS & WELL WATER SYSTEMS

AFFILIATED COMPANIES

Layne-Arkansas Co.	Stuttgart, Ark.
Layne-Atlantic Co.	Norfolk, Va.
Layne-Central Co.	Memphis, Tenn.
Layne-Northern Co.	Mishawaka, Ind.
Layne-Louisiana Co.	Lake Charles, La.
Layne-New York Co.	New York City.
Layne-Northwest Co.	Milwaukee, Wis.
Layne-Ohio Co.	Columbus, Ohio.
Layne-Texas Co.	Houston, Texas.
Layne-Western Co.	Kansas City, Mo.
Layne-Western Co. of Minnesota	Minneapolis, Minn.
Layne-Bowler New England Corp.	Boston, Mass.
International Water Supply	London, Ontario, Can.

Fig. 1—Exterior view taken from same angle as Fig. 2 showing station, garage, operator's office and electric substation. The office is equipped with five lockers and a shower, plus a small storage space for parts

Gulf Coast Station Demonstrates Advantages of Utility Power

By E. L. ROBINSON
Power Engineer, Gulf States Utilities Co.

DURING the latter part of 1926, Magnolia Pipe Line Co. found it necessary to increase the throughput of one of its 8-in. crude-oil lines between Sour Lake and Spindletop, and elected to make the change by a new-fangled method. Instead of looping the line, they built a booster station at Westbury, a midway point, and equipped it with electric-motor-driven centrifugal pumps.

This was one of the first stations of its kind in the South. Prior to that, there were few stations using electric prime movers, and centrifugal pumps for oil-pipe-line work were in the experimental stage. The units for this particular station were designed for the job by the late R. W. Allerton, of Worthington Pump & Machinery Co. His claims as to the low cost of building such a station, the job that could be done with centrifugal pumps and the flexibility and ease of operation that would result, were heard a little dubiously by the pipe-line company officials who wanted to see these things backed up by operating records.

The venture was new to all concerned and the success of the job was due to the close cooperation of representatives of the pipe-line company, pump manufacturer, electrical-equipment manufacturer and the electric-utility company. Teamwork shows results in any game or any job, and the steady improvement in the application of these pumps to this and other pipe-line jobs shows the value of working together toward a common goal.

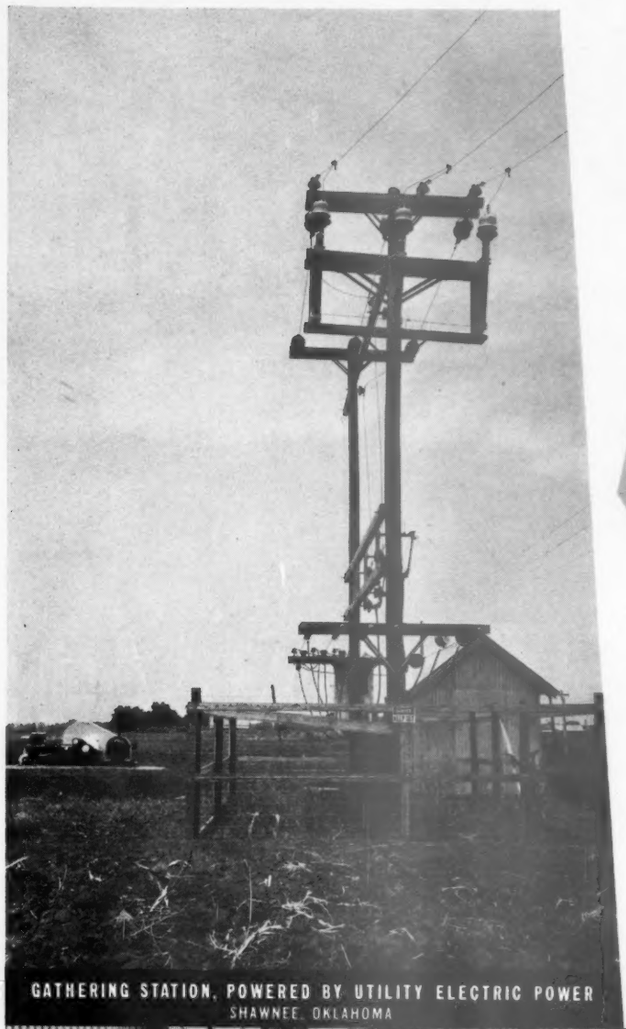
Mr. Allerton wanted to be sure whereof he spoke, so he shipped a supply of Texas crude oil to factory, rigged up pipes and valves and fittings to enable the units to be operated under field conditions, worked out a heating and cooling system for changing the viscosity of the oil under test, and ran tests on a wide variety of products.

Supervises Installation

After minor changes at the factory, the units were shipped to Westbury, and Mr. Allerton came down to supervise their installation. His briefcase bulged with test data showing what the pumps would do under almost any conditions, and he proceeded to make them deliver as specified. One adjustment engineered after the initial test run was that of machining the impellers to meet pressure requirements, but a little job of this nature was simple for the man who had designed the impellers in the first place.

The station was completed in January 1927, and placed in operation the first of February after a careful test period. Accompanying picture (Fig. 3) shows installation as it appeared at that time—long on compactness and operating efficiency but short on looks. The building was a corrugated-iron affair 18 by 44 ft. The pumps and motors were mounted on a common steel base which was bolted to a concrete foundation 4 by 9 ft., with the motors direct-connected to the pumps as shown. The motors were started from push-button-control stations mounted on the building wall, from which control circuits ran to automatic starting compensators. Electric energy entered the

(Continued on Page 172)



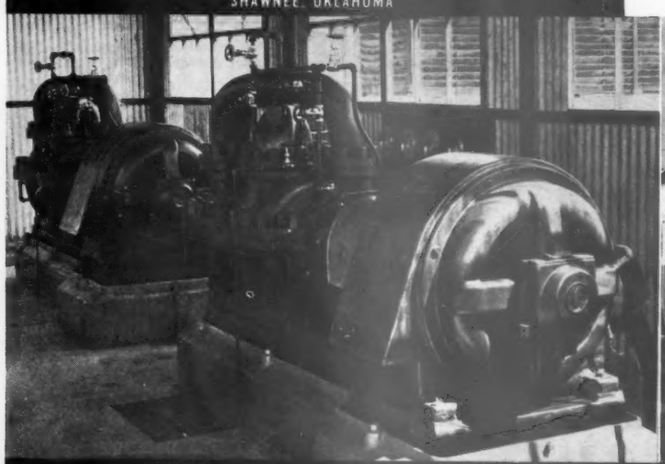
GATHERING STATION, POWERED BY UTILITY ELECTRIC POWER
SHAWNEE, OKLAHOMA

WE'RE READY - YOU EFFICIENT, -

FEW OF HUNDREDS OF STATIONS..

● POWER for moving the world's most precious defense products — oil and gasoline — presents a problem of vital importance to every pipe line operator as construction of thousands of miles of new pipe line nears completion this year! Among the factors which, no doubt, will be considered during this abnormal period are:

The availability of power equipment, and the sufficiency of the power itself. On both these points, Utility Electric Power has a decided advantage in that, with but few exceptions, this power is available to meet any pumping requirement anticipated for the next several years. As to the availability of equipment, our



INTERIOR OF PUMP STATION SHOWING ELECTRICALLY DRIVEN GASOLINE PUMPS

TRUNK LINE PUMPING STATION, POWERED BY UTILITY ELECTRIC POWER
MEEKER, OKLAHOMA

The Petroleum Electric Power Association is the outgrowth of a desire on the part of electric power companies to render greater service, through cooperative effort, to the Petroleum Industry.

PIPELINE OPERATOR TO FURNISH LOW COST POWER!

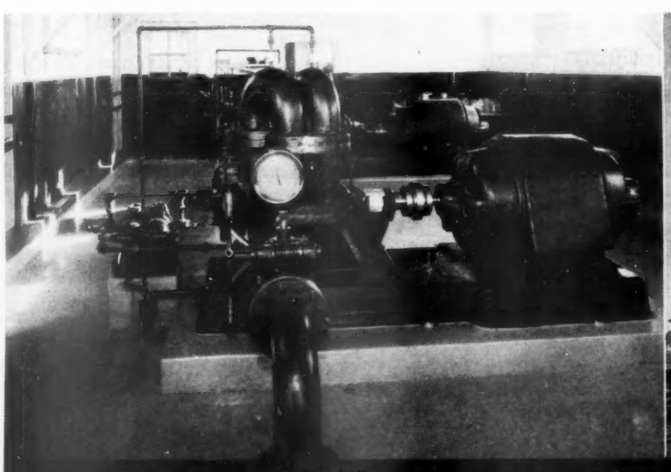
. . POWERED BY UTILITY ELECTRIC POWER

experience is that electrically powered equipment is easier and quicker to obtain than most any other type of power equipment.

In addition to assuring you a sufficiency of power to meet your requirements at all times, Utility Electric Power is considerably cheaper, when final costs are considered. An accurate analysis of costs for pipe line operation, over a period of years, reveals many different ways savings have been effected. (See list of advantages in box at right of page). But most important of all learn how YOU can benefit by using Utility Electric Power by consulting a sales engineer — at your electric power service company — now. It's a personal service you'll appreciate!

ADVANTAGES

1. The induction motor-driven centrifugal pump (3600 R.P.M.) station can be installed for about 40% of the cost of any other prime mover type of pump station.
2. Maintenance cost is about 1/20 that of any other type of pump station.
3. Operating labor cost is only 1/3 that of any other type of pump station.
4. The salvage value of the induction motor centrifugal pump station may approach 75% of the original cost, at most any period of its life, whereas in other types of pump stations the salvage value will not exceed 50% of the original cost.
5. The electric power consumed by the induction motor-driven centrifugal pump station is on a "pay-as-you-go" basis — no capital power investment necessary.



CENTRIFUGAL TYPE PUMP, POWERED BY UTILITY ELECTRIC POWER

PIPELINE STATION, POWERED BY UTILITY ELECTRIC POWER
GOLDSMITH POOL, TEXAS

Use Utility Electric Power!

PETROLEUM ELECTRIC POWER ASSOCIATION

Box 1498, Oklahoma City, Oklahoma

Fig. 4—Interior view showing incoming feeder panels, automatic starting compensators, bus work and air-break disconnect switches

building in conduit, fed through a panel equipped with an oil circuit breaker and then to the individual starting compensators through air-break disconnect switches. Pressure gages mounted near the push-button stations enabled the operator to check the handling of units, and with minor changes the station functioned perfectly as built.

Equipment Rating

The pumps were 4-in., three-stage Worthington centrifugals designed to deliver 30,000 bbl. per day against a discharge pressure of 350 lb. per sq. in. Unit 1 discharged into the suction of Unit 2, which boosted to line pressure of 700 lb. These conditions obtained with the units operated at 3,560 r.p.m. by General Electric two-pole 250-hp. squirrel-cage induction motors.

Electric service was provided by Gulf States Utilities Co. from a three-phase, 66,000-volt transmission line, with energy reduced to three-phase, 2,300 volts through two 333-kva. transformers. These transformers were mounted on a concrete slab in a steel substation equipped with lightning arresters, fuse protection and bus structure for 2,300-volt getaway. The pole-top disconnect switch in Fig. 3 was the property of the pipe-line company and carried their lock. In case of emergency they could kill all service to the station by opening this disconect switch. The line continued from this switch a distance of approximately 40 ft. to the station through a 2,300-volt metering equipment mounted on a service pole. The substation was built as close to the point of service as practicable and the substation plot was 35 by 45 ft. and enclosed by a 6-ft. Cyclone fence, topped by a 1-ft. barbed-wire barrier.

Efficiency of Pumps and Motors

The pumps, now nearly 15 years old, were designed for an efficiency of 76 per cent. The motors were rated at 92 per cent efficiency at full load. In the past 15 years pump manufacturers have materially improved the design of centrifugal pumps and the efficiency range is now in the neighborhood of 83 per cent for units in pipe-line work. Electrical-equipment manufacturers have improved 3,600-r.p.m. motors of the class in question too, though they had less room for betterment of efficiency.

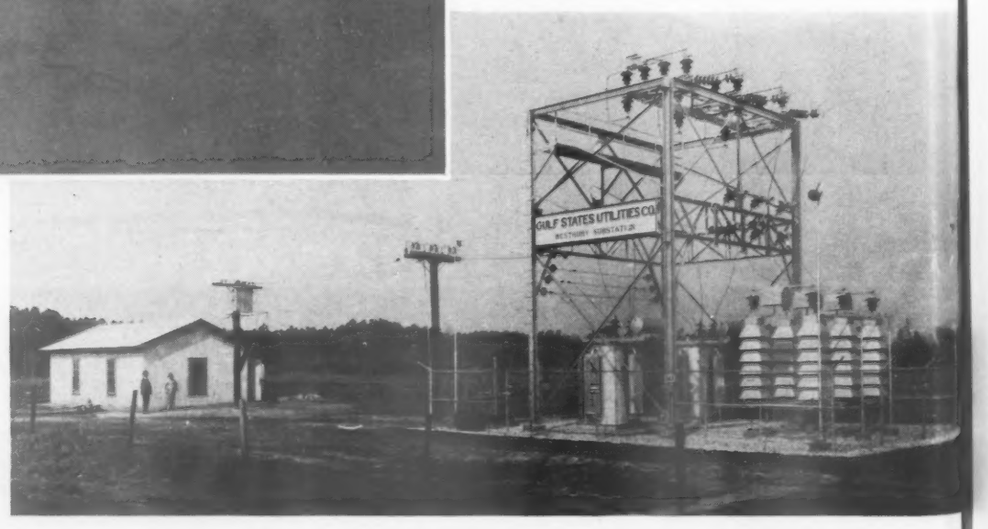
A full crew at this station consisted of one man per shift and this is often a decided advantage over having more operators to provide for. The proper location for a station as determined by careful calculations may place it in a most inaccessible location, making it desirable to keep the operating personnel to a minimum. These stations may even be designed for operation by remote control, though most companies prefer to keep an attendant on duty.

No Storage Required

Centrifugal pumps pick up oil at the incoming line pressure and utilize this pressure. In addition to this utilization of energy, their ability to operate in this manner eliminates use of storage tanks and materially reduces the cost of station construction and the attendant cost of maintenance and operation of these tanks.

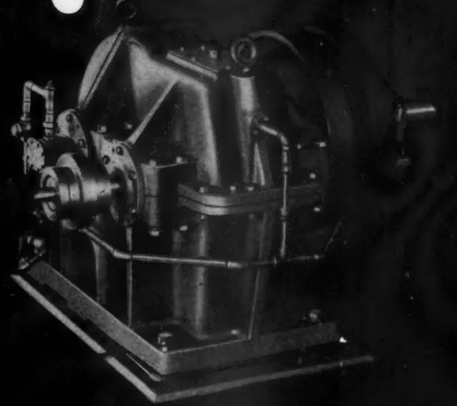
The rate quoted for service at Westbury was a simple one — $1.50 per month per

Fig. 2 (above)—Interior view showing present arrangements of nine pumping units. Nos. 6 and 7 are the ones originally installed. Push-button control stations are mounted on panels located near the wall

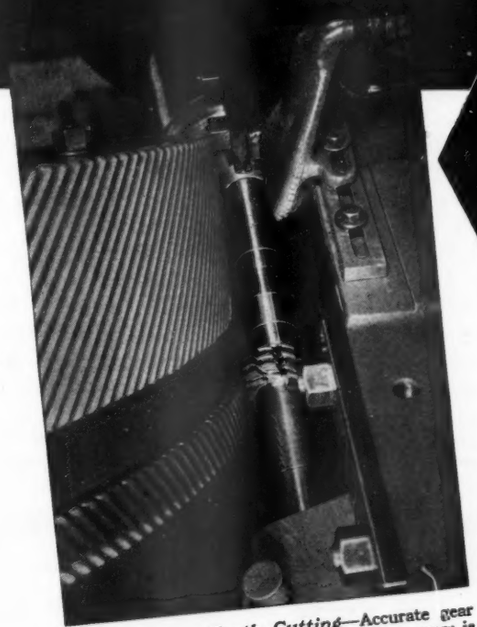


Right: (Fig. 3)—Exterior view showing station, 2,300-volt metering equipment, pole top disconnect switch and 66,000/2,300-volt substation as the installation appeared on completion

quiet!



HERE'S WHY!



Accurate Gear Tooth Cutting—Accurate gear tooth cutting in Westinghouse Speed Increasers is obtained by the hobbing process of gear cutting—the most precise known—on specially built machines like this, the most accurate yet designed.

High-speed geared drives for your pumps, compressors and similar equipment need not mean noisy, vibrating units. Even though the pinion shaft in Westinghouse Type SU Speed Increasers may turn as fast as 6000 rpm, operation is quiet, smooth, vibration-free.

The quiet operation of Westinghouse Speed Increasers results from the high accuracy with which the gear teeth mesh. An important factor in the quiet operation is the precision cutting of the gears by the hobbing process, the most accurate method known.

Type SU Speed Increasers are designed to exact requirements of driven machine and prime mover—whether Diesel engine, gas engine or electric motor. Write for booklet DD-3650 containing full details and helpful application data. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N.

J-07187

Westinghouse Geared Drives

INTER-COMMUNICATION AT IT'S BEST

OIL AND PIPE LINE COMPANIES CAN PROFIT BY THE INSTALLATION OF A KELLOGG RELAYMATIC!

YOUR telephone system is one of the most vital parts of your business. It is the arteries through which you maintain constant contact with all parts of your properties. It carries the pulse of all activities . . . swiftly, directly, reliably. Communication is the life-blood of industry. It is your most faithful servant.

But is your telephone as modern as your business? Is its nerve center as vigilant as a Kellogg Relaymatic?

Here is equipment that can spread instantaneous and simultaneous alarms from any single telephone to any number of telephones . . . at any hour, day or night. Here is dependable, 24-hour service without the need of an attendant! Here is inter-communication at its best . . . served by a switchboard that is alert, active and always ready to set up speedy connections between your offices, refinery, loading stations, pipe lines, dispatcher's office, tank farms, etc. And it operates by itself!

Because the Kellogg Relaymatic provides trouble-free operation with practically no maintenance and no attendant, it furnishes the most economical inter-communication service available. It fits oil and pipe line company requirements like a glove. Years of steady operation in telephone systems throughout the country give proof of the Relaymatic's superiority.

Developed and manufactured by one of the oldest, leading manufacturers of communication equipment (since 1897)! A Kellogg engineer is nearby . . . ready, willing and QUALIFIED to discuss any telephone problem in the interest of helping your business run smoother.

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SWITCHBOARD & SUPPLY COMPANY

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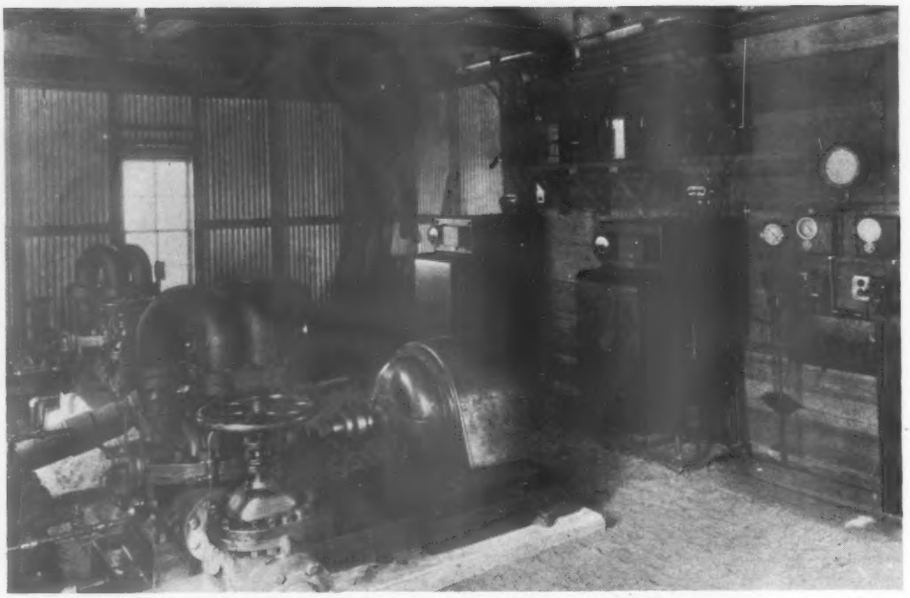

Fig. 5—Interior view of Westbu y station showing pumps, motors and control equipment as originally installed in 1927. Note sand floor

horsepower, plus 1 cent per kilowatt hour for energy used; minimum charge $1.50 per month per horsepower connected. Nobody could complain about difficulty in figuring a bill, and the rate was competitive with other forms of power at that time, but present-day pipe-line operators would find much to say about cost of operation under such a schedule. As an example, 500 hp. operating an average month of 730 hours at 95 per cent load factor would use 258,675 kwh. On the basis of the rate in effect in 1927, this service would have cost $3,336.75. On the basis of the schedule now in effect the same service would cost $2,157.91 or 35.33 per cent less. Streamlining of electric rates to reflect improved operating economies has made it attractive to many pipe-line operators to use electric prime movers.

Station Gets a Face Lifting

In March 1940 a decision was reached to install seven 250-hp. 3,600-r.p.m. motors driving pumps of the same design and rating as the original units. These pumps and motors were available from other stations and were installed to provide stepped-up pumping capacity on lines designated as No. 2, No. 3 and No. 4. In working out plans for the changes, careful engineering combined simplicity of operation with maximum safety, utility of space and station appearance. The face-lifting program produced startling results in appearance as

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Electrical Specialties for the Petroleum Industry

NEMCO Switchboards

From simple one panel switchboards to the most complete multi-panel installation—we can supply switchboards of all types and sizes fabricated in our Tulsa plant to meet any requirement. Among the many types of switchboards we manufacture are—steel self-supporting unit type switchboards for generators and feeders—combination generator and control panels for pumping stations to provide compact, safe, easily installed units that can be readily moved from one location to another—instrument control panels for pumping stations, are a few of the many types we build to meet the varied requirements of the Petroleum Industry.

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NEMCO Explosion Resisting Enclosures designed for Class 1 Group D, Hazardous Locations. Available with—

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- Air Circuit Breakers
- Lighting Switches and Panels
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NEMCO Equipment for CATHODIC PROTECTION

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NEMCO Automatic Pipeline Sampler

Takes continuous samples from 4 to 8 times per minute under pressure. True B.S. Sample, not contaminated with water. Gives true gravity.

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To locate and follow pipeline. Operates without contact with line itself.

Complete information on above equipment available on request

QUOTATIONS FURNISHED ON YOUR SPECIAL REQUIREMENTS

NELSON ELECTRIC MANUFACTURING COMPANY

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Fig. 6—Exterior view showing two incoming electric circuits. The two small transformers on building wall furnish three-phase power for station auxiliaries. The other transformer furnishes station lighting requirements. Metal box on substation fence contains electric meters. Box is equipped with windows so meters can be read by station attendants

will be noted from Figs. 2 and 4, showing interior views, and Figs. 1 and 6, showing the pipe-line building and electric substation.

It was necessary to keep the two old units running while the seven new ones were being installed so the new station was built over the old one after foundations had been poured for the equipment to be added. Two units were added east of the old pumps and five to the west, leaving the original ones now designated as No. 6 and No. 7. After the new building was completed, the old one was torn down, leaving a modern, well-ventilated station in its place.

Change in Electric-Service Arrangements

In the first setup, service to the station was through a three-wire, three-phase line entering the east end of the building after passing through a pole-top disconnect switch and metering equipment as shown in Fig. 3. In the present arrangement it was found desirable to split the load on two circuits at the first pole away from the substation and carry two services into the building in conduit to two control panels, each equipped with oil circuit breakers. One panel feeds Units 1, 2, 3, 4 and 5; the other feeds Units 6, 7, 8 and 9. Bus work has been carefully constructed and is rugged, serviceable and easy to work. Each automatic starting compensator is connected to the feeder bus through an air-break disconnect switch enabling the motor and starter equipment to be inspected or worked on while visibly disconnected.

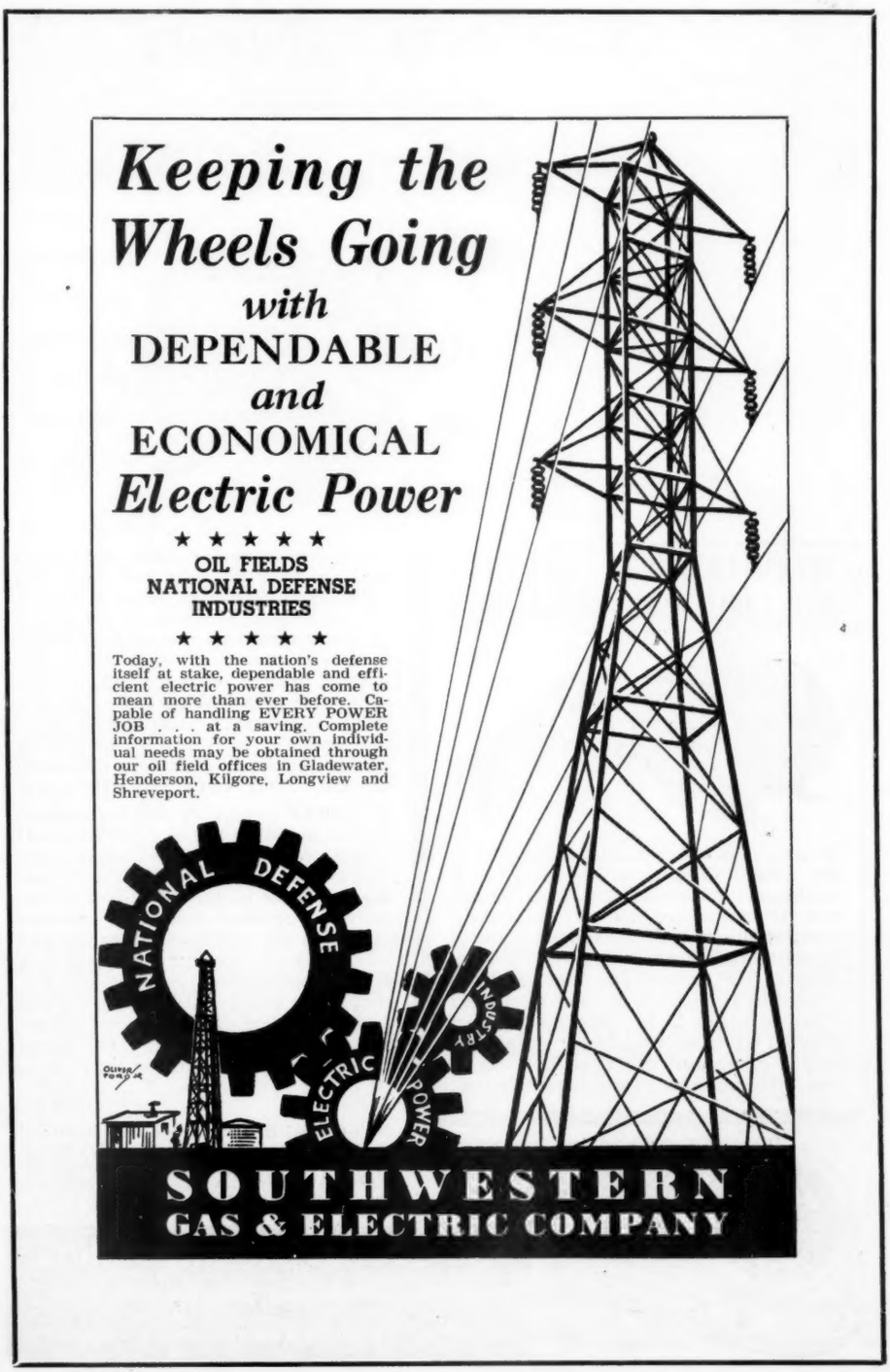
Two push-button control stations mounted on the outside of the building wall provide a means of killing service to each switch panel in case emergency requires such a move. This switching arrangement replaces the pole-top disconnect switch originally used, is simple to operate and easy to reach.

Single-phase station lighting is provided by a 10-kva. 2,300/115/230-volt transformer mounted on the north wall of the building along with two 5-kva., 2,300/115/230-volt transformers used to furnish three-phase power for station auxiliaries. These transformers are mounted outside the building as a precautionary measure and are immediately adjacent to the load they feed.

Water System

The only water required around a station of this kind is for sanitary purposes. A deep well provides an ample supply, including water for landscaping, and pumping is handled by a pressure system powered by a 1-hp. motor.

All wiring is in conduit and 24 150-watt r.l.m. fixtures mounted in two rows of 12 each and spaced approximately 9 ft. between units provides good station lighting. These lights are mounted 10 ft. from the floor and give good distribution. The value of a good lighting job in comparison to the small cost of providing it should assure a proper system in every pipe-line station.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DEPENDABLE
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Electric Power
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Today, with the nation's defense itself at stake, dependable and efficient electric power has come to mean more than ever before. Capable of handling EVERY POWER JOB . . . at a saving. Complete information for your own individual needs may be obtained through our oil field offices in Gladewater, Henderson, Kilgore, Longview and Shreveport.
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SOUTHWESTERN
GAS & ELECTRIC COMPANY

A 2-ton crane operating from tracks that run the length of the building provides a simple and efficient means of handling pumps and motors. Many stations do not have this valuable aid which safeguards men and equipment and speeds up routine maintenance.

Flexibility of Operation Provided by Station Design

Units 1 and 2 operate on a 10-in. line. Units 3, 4 and 5 operate on 8-in. line No. 3 and are equipped with impellers of various sizes. By changing pump combinations, varying operating conditions can be met. A maximum of two units are required to develop top line pressure of 700 lb. Units 6, 7 and 8 operate under a similar arrangement to handle 8-in. line No. 4. Further change in output can be accomplished by throttling the pump discharge, but a loss in efficiency results from such operation. For this reason pump combinations are selected that allow the units to be operated at maximum capacity as determined by the impellers used. Unit 9 completes the group and operates on 8-in. line No. 2.

Outboard pump bearings are lubricated by crude oil taken from the pumping stream and filtered to remove grit and foreign matter. After this oil has been used, it drains to a sump where it is picked up by two 1-hp. motor-driven pumps and returned to the line.

No Increase in Operating Personnel

With nine units instead of two and four lines to handle instead of one, it might seem reasonable to expect an increase in operating personnel but such an increase is not necessary. One man per shift still handles the job of actual station operation, plus that of growing flowers and otherwise keeping the grounds in "parade" condition.

In addition to modernization of the station wiring when the seven additional units were installed, the couplings between motors and pumps were enclosed as a further safety precaution. Fire extinguishers located in readily accessible places are designed for use where electrical apparatus is involved. Not a single lost-time accident, fire or other mishap has marred the record of this station in its 15 years of operation.

Number-One Pipe-Line Job

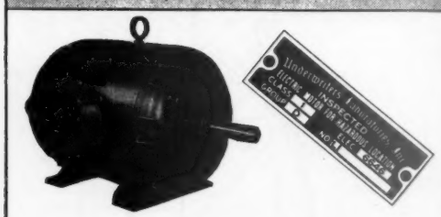
The biggest pipe-line job in the history of the industry finds 11 major companies engaged in making preliminary studies for building a 24-in. crude-oil line from Longview, Tex., to refineries on the eastern seaboard in the Philadelphia-New York area. The line will be designed to handle 250,000 bbl. of crude oil daily and announcement has been made that 25 pumping stations will be required. These will be spaced at intervals of approximately 60 miles and each station will be equipped with three 1,250-hp. electric-motor-driven centrifugal pumps. The knowledge gained through years of pipe-line operation, the skill of the best engineers in the business, the coordinated effort of pump and electric-equipment manufacturers and electric-utility companies will combine to make this job the last word in pipe-line technique.

The Plantation Pipe Line Co. is engaged in building a refined-products line from Baton Rouge, La., to distribution centers in southern states as far east as Greenville, N. C. Electric-motor-driven centrifugal pumps will be used on this line and an innovation in the setup is the design of motors and pumps to operate at 600 hp., with one size impeller and 900 hp. by increasing the impeller size. This arrangement provides flexibility of operation to meet anticipated requirements.

Fifteen Years of Field Experience Now Paying Dividends

These jobs will make pipe-line history and the new tool that was an interesting experiment 15 years back will take its place with the tried and proven equipment used under the skillful guidance of engineers from the major companies who know the answers from A to Z.

WAGNER TYPE HP MOTORS FOR EXPLOSIVE ATMOSPHERES



Wagner type HP Explosion-Proof motors are similar in construction to type CP totally-enclosed fan-cooled motors except that HP motors are built to withstand internal explosions and prevent the escape of flame to the surrounding atmosphere. Wagner HP motors are tested and approved by Underwriters' Laboratories for Class 1 Group D Hazardous Locations. Wagner HP motors are designed and built to give many years of trouble-free service under the most severe operating conditions.

In the oil fields and refineries and along the pipe-lines you can find these fifth columnists—dirt, dust, acids, abrasives, rain, snow, heat, and explosive fumes hard at work spreading destruction among open-type motors—slowing down production because of motor failures. The answer to such a problem is to use motors that are protected against these destructive agents . . . motors that continue to operate year after year despite these conditions . . . Wagner CP and HP motors.

Wagner CP motors are ideal for outdoor, and for indoor installations where atmospheric conditions are such that open-type motors, involving excessive maintenance, cannot be used. No dust, fumes, moisture, or other destructive elements can reach the vital parts (bearings and windings) of CP motors because they have a double-frame construction. The cooling air is circulated *between* the two frames. Because of this integral protection, costly shutdowns are eliminated when CP motors are put on the job.

★

Both CP and HP motors are built in several electrical types to take care of a wide variety of applications. These motors are fully described and illustrated in bulletin MU-182. Send for a copy today.

50 YEARS OF SERVICE

This year Wagner celebrates its fiftieth year of service to industry and the home—as a manufacturer of motors, transformers, and fans of the highest quality.

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Engineers backed by years of experience in pipe line pumping power requirements are at your disposal. Just write or call one of the offices listed.

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OIL INDUSTRY GOES TO
MERCOID
For Its Automatic
Control Requirements

SAFETY
IS AN ESSENTIAL DEFENSE REQUIREMENT

All phases of industry is geared up to high speed during a period of national emergency. Taking extra precautions is the order of the day. This is particularly true in the oil field where definite pressures and temperatures must be maintained.

Mercoid Controls are playing an ever increasingly important part in this field. They are the choice of the leading engineers.

Experience has proven the dependableness of Mercoid Controls. They meet the exacting requirements of the oil industry.

Mercoid temperature or pressure controls with explosion-proof cases (as illustrated) are recommended for hazardous locations.

Mercury Switches Used Exclusively

An outstanding feature in every control is the hermetically sealed Mercoid Switch. Its known immunity to dust, dirt, corrosion, pitting or sticking—common causes of contact trouble—guarantees the highest contact efficiency.

See catalog for detailed information.
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IT PAYS TO GET THE BEST

Economics of Transportation by Pipe Line Constantly Changing

(Continued from Page 56)

in many instances to furnish a less expensive means of transporting oil than rail transportation at rates which the railroads could lawfully charge. Most railroads, particularly those serving the oil fields, are far from the point of saturation in the utilization of their plants. Whether or not they could have moved trainloads of oil tank cars at rates which would have forestalled the construction of pipe lines and which would have been profitable to rail carriers is a question about which there continues to be a difference of opinion. The oil industry itself answered the question of savings under the published rates of the railroads for single-car shipments by building the pipe lines. The terminals of these pipe lines thus far have been at or near large consuming areas or ports on rivers, the lakes, the gulf, or the ocean.

The cost of transportation by barge and by ocean-going tanker has been heretofore regarded as less than by pipe line although this view may be modified when the costs via the larger pipe lines now under consideration become available. The engineers of the companies owning the tankers apparently are still convinced that transportation by tanker costs less or will become more quickly available than by additional pipe lines. Since the transfer of some tankers from coastwise to overseas service, the owning companies have placed orders for other tankers. To what extent the difficulties in constructing pipe lines east of the Mississippi River may have been a factor is best known to these engineers themselves. The legislatures in oil-producing states have been favorable to the construction of pipe lines and companies have been able to obtain rights-of-way in such states. However, when a pipe line was recently proposed from Louisiana across the southeastern states into North Carolina, the promoters encountered the most stubborn resistance in at least one state. The outcome was a law passed by the Congress and approved July 30, 1941, (Public, No. 197, 77th Cong., Chap. 333, 1st. Sess.). This statute gives private promoters the right of eminent domain if the president declares by proclamation that construction of interstate petroleum pipe lines is or may be necessary for national defense. On August 24, 1941, the president of the United States issued the first such proclamation which will enable private corporations to obtain the necessary right-of-way and construct a pipe line from Louisiana to Greensboro, N. C. It is expected to be used for moving gasoline. In the event private agencies are unable to construct the line, the president may provide for the construction and operation by a government agency. When the construction is by other than a government agency, government aid may be extended. These powers expire after June 30, 1943, and operation by a government agency shall not continue for more than 1 year after the termination of the unlimited emergency which was proclaimed on May 27, 1941. This law thus does not signify the adoption of any permanent policy of federal aid to pipe lines.

A large number of tank steamers has been transferred from the coastwise to the overseas service. Perhaps still others will be transferred in the future. Tank steamers have been transporting about 1,200,000 bbl. of petroleum and products each day of the year from the Gulf Coast to destinations along our Atlantic seaboard. A transfer of the tank steamers to overseas service is regarded as a military necessity. A consequent interruption in the movement of petroleum

For joint-making at wells, separators, tanks, scrubbers, etc., Dresser Long Couplings simplify and speed up work by bridging gaps where pipe ends do not meet. The need for exact pipe lengths and precise pipe-fitting work is eliminated. Also useful for installing valves and branch fittings and making cut-ins. Standardize today on Dresser Long Couplings. Save time, money, trouble.

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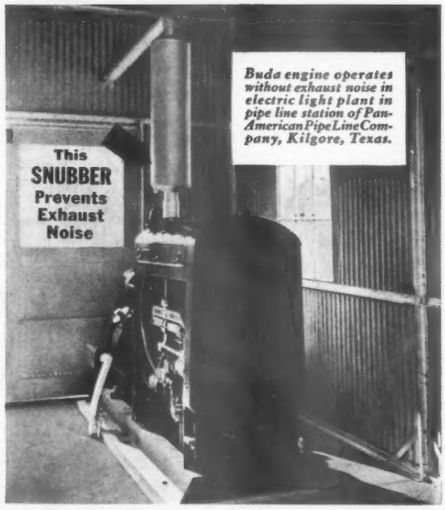
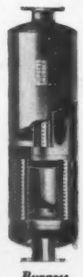

This SNUBBER Prevents Exhaust Noise
Buda engine operates without exhaust noise in electric light plant in pipe line station of Pan-American Pipe Line Company, Kilgore, Texas.

Your engine exhaust can be
QUIET, **too**


Burgess Exhaust Snubber

If you operate a Diesel or gas engine in refinery service, a Burgess Exhaust Snubber will eliminate troublesome exhaust noise. Operating on the snubbing principle of exhaust quieting, Burgess Snubbers smooth the noise-making pulsations so that exhaust gas flows quietly from the tail pipe.

Burgess Snubbers are available for any make engine. Burgess engineers will gladly help you solve any exhaust noise problem. Write for Snubber Data Book today.

Burgess Battery Co., 516 W. Huron St., Chicago
Originators of Snubbing Principle for Quieting Diesel Exhausts—Pat. and Pats. Applied For

BURGESS SNUBBERS

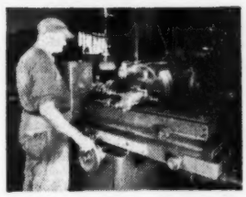
products to the most densely populated area in the country is a resulting acute problem of domestic economy. A better utilization of the remaining tank steamers is apparently not sufficient to replace the number which has been taken out of the coastwise service. Eleven companies now propose a pipe-line system 1,570 miles in length with a diameter of 24 in. in its major segment which would be connected in the Southwest with the pipe lines serving the oil fields in that region and which would have a daily capacity of 250,000 bbl. to be delivered as far east as Bayway, N. J. It is planned to amortize the estimated $70,000,000 for construction within 5 years. If this pipe line should be constructed, and if it should be amortized as planned, it will be interesting to see if the tank steamers can take the traffic from it. Then the problem will be whether the cost of operating the pipe line will be more or less than the cost of operating and amortizing over a reasonable period the tank steamers. The engineers for companies which have long operated pipe lines and tank steamers may now know the answer to this question.

The railroads have long since lost this traffic to the tank steamers. Now that this competition is suddenly being reduced, at least for a time, the railroads are obtaining some of this traffic to an increasing extent. By the end of this year shipments of crude oil into Bayway, N. J., by tank car may reach 40 per cent of refinery capacity. It has been estimated there could be made available for moving petroleum products from the Mid-Continent and southwestern field to the East approximately 20,000 railroad tank cars. Almost all of these cars are privately owned and are not under the control of the railroads.

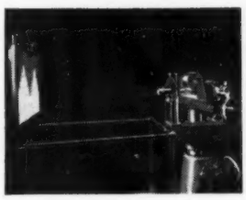
In this situation the railroads can maintain their present rates as maximum reasonable rates; or they can voluntarily reduce them below the maximum of reasonableness, but still somewhat higher than they have been by tank steamer or what they will be by pipe line after the pipe lines are constructed. Under such a policy of reduced rates the consumers might have to pay 2 or 3 cents more per gallon of gasoline than they would have to pay if it could be transported by tank steamer. This policy would give the railroads additional revenue at reasonably compensatory rates until the tankers are restored to their coastwise service. By handling the tank cars in solid dispatch trains and by using other tank cars to fill out the consist of other trains, the railroads could doubtless make a much better showing in the volume of petroleum products transported than is generally believed.

Could the railroads pursue a policy of reducing their rates generally so as to forestall the construction of new pipe lines? It is doubtful whether the reductions that would be necessary would leave enough to cover the out-of-pocket expense to the railroads. Such a course would presuppose enough railroad tank cars to handle the traffic. The oil companies, even if there were sufficient railroad tank cars, might not be willing to permit the railroads to keep the business at any rates the railroad companies might make. They might desire a margin of safety in pipe-line capacity equal to one-third to one-half of the total consumption. There might be a general unwillingness to have all of the "petroleum eggs" in one basket. Even if the rail carriers should adopt the policy of drastic rate reductions, the public might nevertheless back the construction of oil pipe lines and the replacement of the transferred ocean-going tankers, regardless of how effectively the rail carriers might undertake the rate adjustments to get and hold this traffic. Another course which the railroads could adopt may be designated as "opportunistic," that is, to put in such lawful rates as would be for the present remunerative to them. Apparently the trend is in this

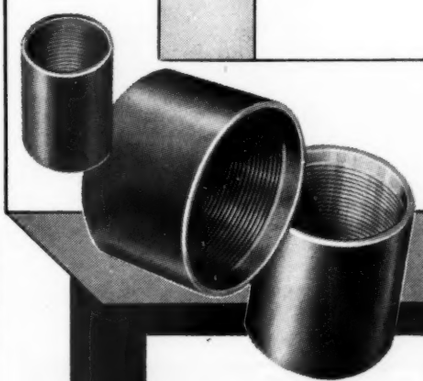
Exact threading



Photograph of a grinder that cuts the tools responsible for the accuracy and uniformity of the threads on Harrisburg Couplings and Flanges



Here is the Comparator, a machine for checking form, taper and lead of threads on all tools and gauges used in the manufacture of Harrisburg products



Combining the skill of the modern mechanic with steel of a special fitness for the job in hand, Harrisburg also makes sure of the threading operation, so important in coupling and flange manufacture. All threads are machined by an exclusive, special process pioneered by Harrisburg. They are strip-proof and unsurpassed for uniformity of form, height, angle and lead. Exact threading and prime steel are "regular" requirements in Harrisburg products.

Harrisburg makes: Alloy and carbon steels, seamless steel cylinders, pipe couplings, pump liners, liquefiers, hollow and drop forgings, pipe flanges, bull plugs and coils and bends.

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Your supply store will show you this and other Chrome Clad Steel Tapes especially designed for oilmen. Ask to see them and write us for a copy of our new complete Catalog.

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Upset and Plain
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"X-L" Tubing Couplings withstand internal pressure many times greater than rated capacity and remain in perfect shape, fit for actual use. Our patented recessing process means concentricity of recess in combination with threaded section of coupling, assuring accuracy in alignment of joints. Microscopically tested to A.P.I. Standards.

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WHEELING MACHINE PRODUCTS COMPANY
WHEELING, W. VA.

direction. Up until and including August 24, the railroads have reduced their rates on crude petroleum to the East in certain instances.

Substantial rate reductions have been established recently by rail carriers to facilitate the movement of crude oil to Atlantic Coast refineries in the New York and Philadelphia areas. As of August 27, seven applications have been filed with the Interstate Commerce Commission, and all of these petitions for special permission rates have been granted on a temporary basis, subject to renewal at expiration date. No applications for special reduced rates on refined petroleum products to eastern seaboard destinations have been filed to date.

One of these adjustments on crude oil provides for a movement from Lima, Ohio, which is a pipeline terminal point, to refineries at Bayway, N. J. The present rate is 17.5 cents per 100 lb., or less than half the former rate of 38 cents. In the application it was stated that the "normal" rate, which was 26 per cent of first class, was out of alignment with rates on other movements of crude petroleum to refinery points in the Middle West. The effect of the adjustment was to establish a rate approximately 12 per cent of first class, and this standard also was used in arriving at certain of the other proposals for rate reductions which are cited below. It may be noted that the Lima-Bayway movement involves a rail haul of nearly 800 miles, and the 17.5-cent rate therefore yields approximately 4.4 mills per ton-mile to the rail carrier. The cost to the shipper for this rail haul amounts to about 55 cents per barrel. It is reported that a substantial and increasing rail movement of crude oil, amounting currently to 16,000 bbl. per day, has developed over this and other routes to Bayway. A further increase to 30,000 bbl. per day is expected in the near future. The latter amount is equivalent to a daily arrival of about 125 loaded tank cars of 10,000-gal. capacity.

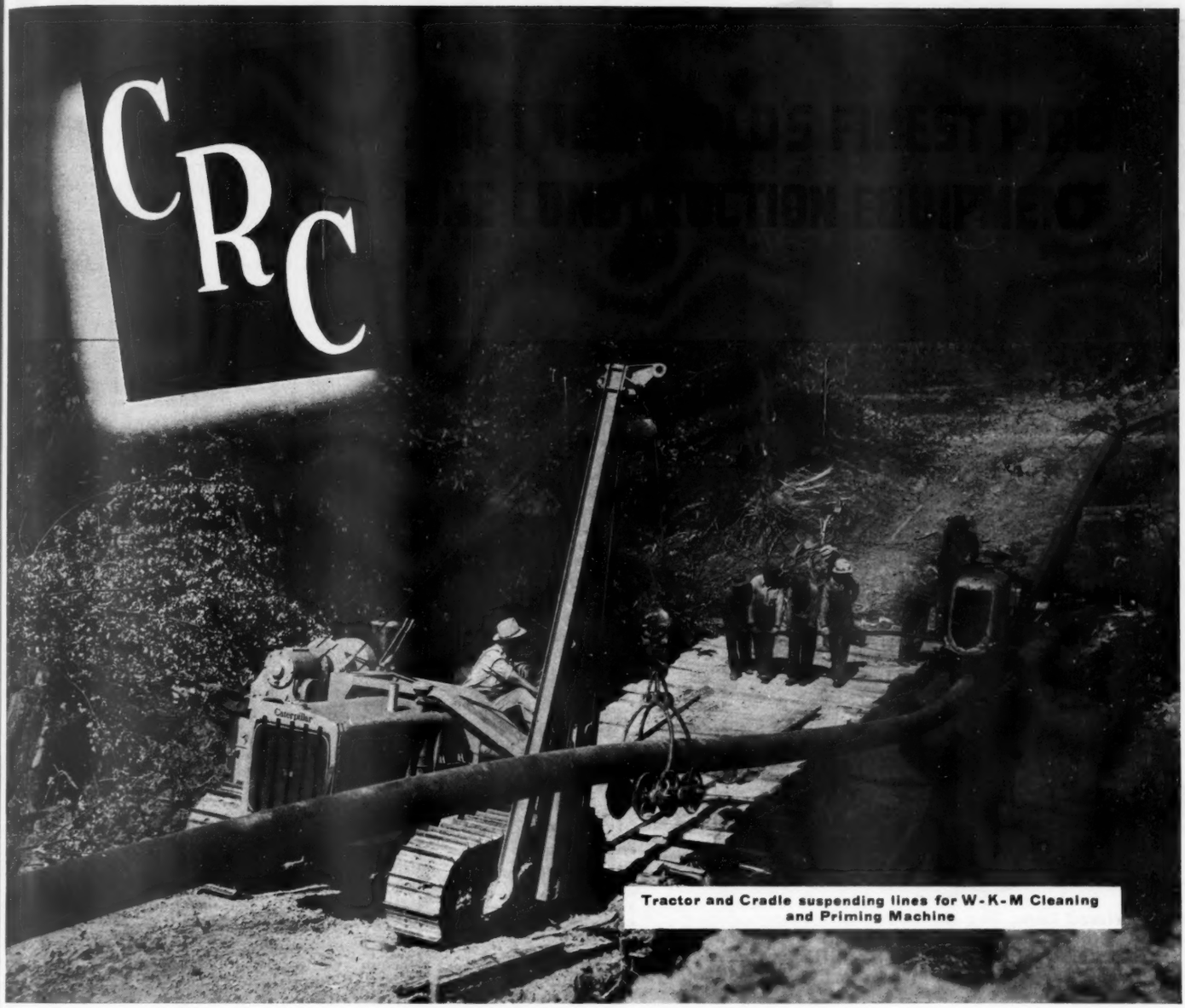
On August 1, a temporary rate of 14 cents per 100 lb. was approved for rail movement of crude petroleum in tank carloads from a pipe-line terminal at Rootstown, Ohio, to Marcus Hook, Pa. The former rate was 31 cents. The rail distance via the Pennsylvania Railroad is about 460 miles, and the rate of 14 cents per 100 lb., or 43.5 cents per barrel, is equal to 6.1 mills per ton-mile.

A rate of 21 cents per 100 lb. of crude oil in tank carloads from pipe-line terminal at Martinsville, Ill., to a refinery at Bayway, N. J., was approved on August 5. The new rate was effective on 1 day's notice, and it is to expire on October 15, 1941, without prejudice as to republication. The distance from Martinsville to Bayway, via the Pennsylvania Railroad and the Central Railroad of New Jersey, is approximately 900 miles. The reduced rate of 21 cents per 100 lb. or $4.20 per ton, yields 4.7 mills per ton-mile for a haul of this length.

By order dated August 26, permission was granted to apply the aforementioned reduced rates from Lima and from Martinsville to Bayway, also to Tremley, N. J., which is adjacent to Bayway.

In still another instance, a reduced rail rate was sought in order to encourage rail movement from an interior pipe-line terminus to Atlantic Coast refineries previously supplied wholly by tanker service. A rail rate of 23 cents per 100 lb. was approved August 6 for movement of crude petroleum from Owensboro, Ky., to Bayway, N. J. The reduced rate compares with a former rate of 72 cents. The distance from Owensboro to Bayway via direct routes is approximately 1,000 miles. The 23-cent rate per 100 lb., or 72 cents per barrel, will yield 4.6 mills per ton-mile for a 1,000-mile haul.

A rate of 12 cents per 100 lb. on crude petroleum oil from Colegrove, Pa., in the general vicin-



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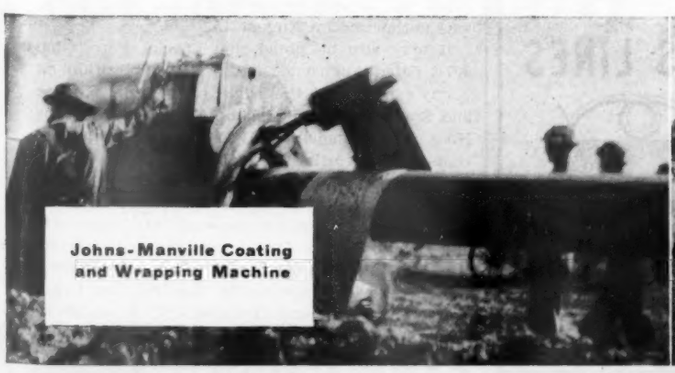
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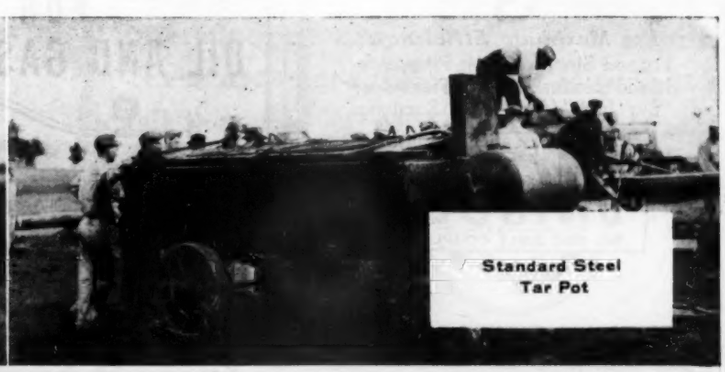
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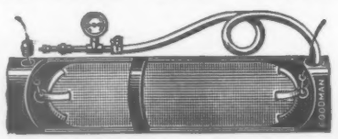

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ity of Bradford, to Marcus Hook, Pa., became effective July 15. The former rate was 26 cents. The distance from Colegrove to Marcus Hook via the Pennsylvania Railroad is about 365 miles, and the reduced rate therefore yields 6.6 mills per ton-mile to the carrier.

The remaining application for special permission reduced rates contemplates an all-rail movement of crude petroleum from East Texas and Louisiana oil fields to Philadelphia and Marcus Hook, Pa. This application, granted August 15 and to be effective on 1 day's notice, provides a rate of 44 cents per 100 lb. from Kinsloe, Tex., and of 41 cents from Singer, La. The prior rate was 65 cents from both points. The distance from Kinsloe, Tex., via specified Missouri Pacific routing to St. Louis and thence via the Pennsylvania Railroad to Philadelphia and Marcus Hook, is slightly more than 1,550 miles. Over the Baltimore & Ohio from St. Louis, the total distance is about 1,600 miles to Philadelphia and slightly less to Marcus Hook. The proposed rate of 44 cents per 100 lb., or $8.80 per ton, would yield approximately 5.5 mills per ton-mile for a haul of 1,600 miles. The cost to the shipper is $1.37 per barrel. From Singer, La., to Philadelphia and Marcus Hook, a number of routes to Mississippi River gateways are specified, some of which are circuitous. The distance over the most direct of the specified routes is nearly 1,700 miles to Philadelphia and Marcus Hook. The new rate of 41 cents per 100 lb., or $8.20 per ton, will yield the carriers 4.8 mills per ton-mile. Per barrel, the cost to the shipper amounts to $1.27.

By August of this year enough tank steamers had been taken out of the coastwise service to leave an estimated 20 per cent of the movement of petroleum products to the East to other means of transportation. The railroads can move this amount provided tank cars are available. Consideration is being given to the possibility of pooling products shipped by tank steamer with such products shipped by rail after they have reached their eastern consignees. Such a pooling in the hands of the consignees would make possible the spread over all petroleum products shipped to the East of the increase in expense of shipping a portion by rail. It is estimated that such an arrangement would involve an increase in price to the consumer of less than 1 cent per gallon.

EDITOR'S NOTE—The following supplementary discussion was prepared by Dr. Splawn on September 2, bringing up to date developments between that date and the time the main discussion was prepared.

On August 29, Special Permission 4128 authorized the carriers to establish on 1 day's notice, rates equal to 13 per cent of the first-class rates from Benton, Ill., and Sohio Spur, Ill., to Baltimore, Md.; Bayonne; Bayway; Tremley, and Petty's Island, N. J., and Marcus Hook and Philadelphia, Pa. These rates bear the same relationship to first class as those from Kinsloe, Tex., and Singer, La., to Philadelphia and Marcus Hook, Pa., in connection with which short notice was authorized on August 15.

It may also be noted that Special Permission 4071, dated August 27, authorizes publication on 1 day's notice of the same rates from Kinsloe and Singer to Petty's Island, N. J., as to Marcus Hook and Philadelphia, Pa. These rates are 44 cents from Kinsloe and 41 cents from Singer, and are to expire on June 30, 1942.

On August 30, short-notice authority and relief from the Fourth Section (Special Permission 4144 and Fourth Section 14362) were granted to establish the same rate of 23 cents per 100 lb. from Belton, Browder, Spottsville, Stanley, and Utica, Ky., to Bayway and Tremley, N. J., as from Owensboro, Ky., except that from Belton and Browder the rate is to be 1 cent higher. Short-

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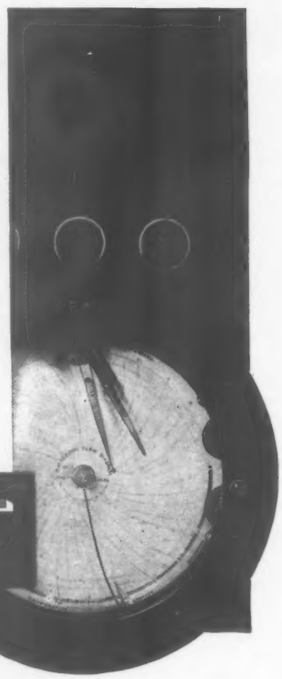

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notice authority in connection with the Owensboro rate was approved on August 6. Another order (Special Permission 4143), also dated August 30, permits the carriers to establish on short notice the same rate from Owensboro, Ky., to Tremley, N. J., as to Bayway, N. J. These adjustments were all made subject to 1 day's notice.

An initial step has been taken for a general adjustment of rates on crude petroleum oil moving from points in official territory, including Illinois territory, to Atlantic seaboard refineries. In Fourth Section Order 14361, dated August 29, 1941, relief was granted from the long-and-short-haul and the aggregate-of-intermediates provisions of the Fourth Section, for the transportation of crude petroleum oil, in tank-car loads, from all petroleum-oil producing and shipping points in official territory, including Illinois territory, to Bayonne, Bayway, Tremley, Paulsboro, and Petty's Island, N. J., Marcus Hook, Pa., and Twin Oaks, Pa., and Baltimore, Md., and also to other petroleum refining points on the Atlantic seaboard which have been receiving their supplies by tank steamer. The order specifies that the lowest rate applicable over any route is to be 12 per cent of the first-class rates prescribed or approved in Eastern Class Rate Investigation, 164 ICC 314, and supplemental reports. A further condition is that the relief shall not apply to any line or route over which the rate authorized would yield less than 4 mills per ton-mile.

No rates have as yet been filed under this authority, but it would seem to be the intention of the applicants to establish generally within the eastern territory rates on crude petroleum oil moving to seaboard refineries which are uniformly constructed on the basis of 12 per cent of first-class rates. Most of the isolated adjustments made to date have been in accordance with this formula.

•

United Gas Expands to Serve Defense Industries

Normal growth of the Gulf South coupled with the increasing demands for natural-gas fuel by industries engaged in filling national-defense contracts are necessitating constructon by United Gas Pipe Line Co. of approximately 300 miles of transmission line during 1941.

In the process of construction is a 200-mile line which will run from the gas fields of southern Louisiana to connect with the system at Mobile, Ala. Thirty-one miles of 16-in. pipe between the Mississippi River and the Lirette gas field have already been laid. Ten miles of 10-in. from Mandeville Junction to the Bogalusa 8-in. lateral have been completed and are ready for testing. Clearing has started on the right-of-way for the 16-in. line running from Mandeville toward Mobile. Pipe is being welded into two-joint sections after coating with somastic, preparatory to starting the 25-mile crossing of Lake Pontchartrain about the middle of September.

Early in 1941 United completed more than 50 miles of line running from a main transmission line near DeQuincy, La., to Camp Polk, headquarters for the Army's latest mechanized units. The company flanged up to the Camp Polk tap line 43 days after construction was started.

Eighteen miles of 12-in. pipe between the Agua Dulce, Texas, gas feld and United's Bruni-Comal line were replaced with 18-in. pipe, the job being completed in August.

Tap-line construction to provide service to city gate and industrial customers of United has totaled 34 miles since the beginning of the year.

Also under construction is a compressor station at Tallulah, La. Three 1,000-hp. units are being installed and foundations for a fourth engine are being laid in anticipation of future demands for increased supplies of natural gas for the Mississippi, Alabama, Florida area.

Means of Preventing Accidents In Constructing Pipe Lines

By HARRY F. SIMONS and PAUL REED

RECENT advances in pipe-line building equipment and technique have not been accompanied by a reduction in the accident rate to workers. Increased size of the lines being built, greater speed in construction, introduction of new methods and procedures, and the hiring of many new men necessary to meet the demands of an expanding industry all combine to force the number of injuries and fatalities upward.

Statistics on accidents in pipe-line construction are difficult to obtain principally because most of this work is done on a contract basis and the contractors as a group do not belong to any central agency gathering accident information. Available data do not include a breakdown of the accidents in the construction and operating departments but lump them in one figure.

During the past 6 years the trend of accidents in the pipe-line department has been generally downward. In 1939 the all-time safety record was established when there were 3,849 men employed by pipe lines for each fatality and 46 men for each lost-time injury. This was during a fairly slack year in construction and repair work when the total number of employes included in the report was down. Injury index for 1939 was 23.85.

The increase in pipe-line construction during 1940 led to the employment of about 600 additional men in the industry and caused the injury index to jump to 38.11, the highest since 1936. There were 1,375 men employed to each fatality and 44 men to each disabling injury.

Looking at these facts, and from a study of accident reports on other industries, it is evident that construction organizations must take special precautions if a substantial jump in the injury rate is to be avoided.

Through precautions taken by foremen it is possible to reduce accidents occurring to men working in ditch

Hazards in Pipe-Line Construction

The possible causes of injuries on pipe lines under construction are different from those of any other branch of the oil industry.

Hazards include strains from lifting, being struck by a joint of pipe or the tractor moving it, being caught under a joint of pipe accidentally dropped, and generally the dangers of working around machinery and heavy equipment being moved. Most of these surface dangers are obvious to the workmen and observers and care on the part of the individual is the main preventive. A less obvious but much greater danger is present in and around the ditch in which the pipe is laid.

When men keep in mind that accidents in pipe-line construction work most frequently occur in situations which appear to be harmless, it is possible to reduce much serious trouble. It cannot be said that the ditch is dangerous for men are getting in and out of it every day. But experience shows that more serious and fatal accidents come as a result of a caving ditch than any other cause. When men recognize that a caving ditch may kill they make a point of observing whether conditions may be dangerous in the ditch where they are working. To the casual observer it would seem that electric welding and tractor driving would be the most dangerous parts of the work but pipe-line men know they are responsible for fewer fatalities than the innocent-looking ditch.

In this connection it should be mentioned that accidents due to a cavey ditch can be reduced by the foresight of the foremen. In any gang there are always unskilled men who are unfamiliar with pipe-line work who must be warned when danger exists. On the other hand, warnings must sometimes be given to experienced men who get the impression that they lead a charmed life which prevents their being injured because they have been at the game for years.

Working in the Ditch

When men are in the ditch for shoveling work, known as crumbling, the foremen should see that pipe is supported by a tractor. Some contractors think this is superfluous but the skids should not be relied on entirely in situations of this kind. Furthermore, where a ditch is cavey, the foreman in charge of the work should make a point of keeping tractors from coming close to the edge of the ditch while there are men in it. Like the superstition that it is bad luck to walk under a ladder, crawling under supported pipe is regarded by experienced construction men as bad practice.

If dangerous situations always looked dangerous, it would be easy to reduce accidents. The lurking danger is often concealed by an innocent appearance. This year three men were killed at the end of the day while returning to town on a truck from the pipe-line construction job. The truck slipped into a small ditch by the highway and overturned. If it had turned over faster than it did, the men would have been aware of danger and would have jumped to safety. But the truck turned over slowly; the men took it as a joke and held on without suspicion that the incident meant death to three of them.

Work in connection with tying into a natural-gas line filled with gas, known as a "hot line," is dangerous but experienced construction men recognize the possibilities for trouble and by taking proper precautions they can complete this work in safety. It is general practice to have a blind flange placed at the end of the hot line while work is in progress near it. Before a gas line is blown off special effort should be made to search the ground in the neighborhood for embers or the remains of brush fires which might not be readily observed. These can cause seri-

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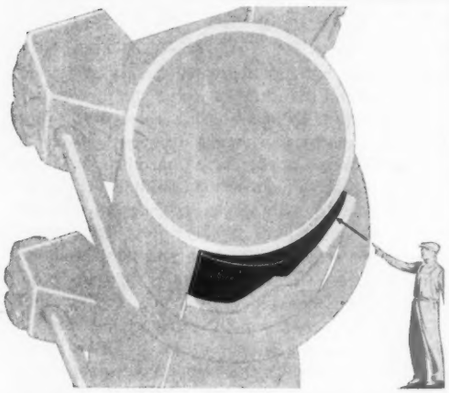

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ous fires when gas is blown into the air near them.

In recent years major companies have had considerable experience in the use of welding for repairing hot lines. It has been clearly demonstrated that this kind of work can be safely done. Since there is a possibility of fires occurring due to certain conditions which may not be apparent, some companies have a rule that welders must wear asbestos suits when working in a bell hole on a hot line. There has been some difficulty in enforcing this rule because welders feel safe due to the large amount of work which they have done on hot lines where there were no fires.

Fire Dangers

A serious accident occurred during the testing of a crude-oil line shortly after the completion of one of the pump stations. Pumps were started and pressure in the line raised to the point specified by the engineers. This was done during the noon hour when men in the construction gang were sitting under the trees near the station eating lunch. Trash was being burned nearby. As the pressure increased a coupling on the discharge line from the pumps failed to hold and a stream of oil spurted on the men. The oil ignited and fatal burns were the result. The accident emphasizes the importance of keeping fires away from lines under test and also of keeping workmen and visitors away from a line until after it has been completely tested.

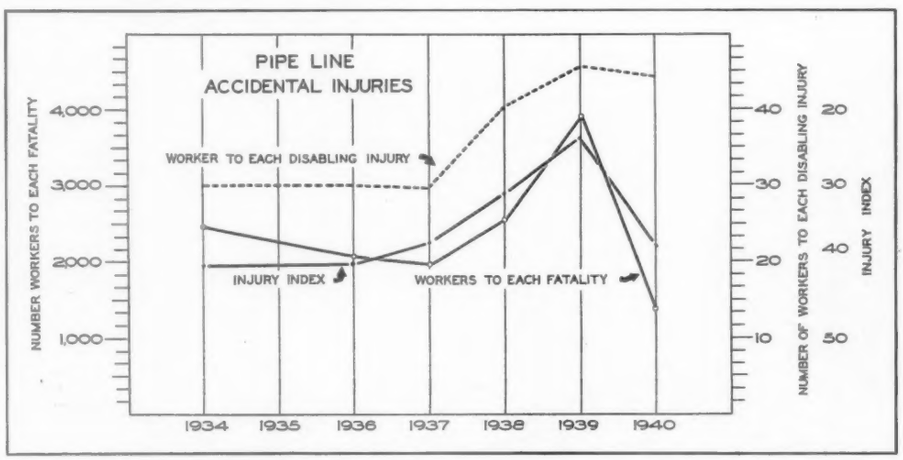
Fires on the right-of-way during construction are not particularly hazardous although they may result in damages which will cause a lawsuit on the part of the landowner. In California fire-fighting equipment is transported along the right-of-way of lines under construction so that it may be available in case of grass or brush fires caused by the electric welding.

The serious and fatal accidents are not the only concern of the workmen and foremen on pipe lines as there are numerous minor mishaps. Actually, most of the accidents result in some damage to the fingers, hands, shoulders, toes, feet and ankles. The number of injuries to the backs of workmen due to their attempting to move a heavy object or because they do not use the proper technique in lifting, also demands attention.

As pointed out previously, the more dangerous-looking occupations are really the least dangerout and actually the roustabouts and laborers are the ones most frequently injured. A recent survey shows that out of 195 pipe-line construction accidents, 176 of the victims came under the classification of roustabouts and laborers. Most of these accidents were due to inattention or lack of experience.

Use of new and inexperienced men will probably increase during the next year due to greater construction activity, withdrawal of some pipeline workers into defense projects and jurisdictional disputes between labor union branches which often force the hiring of new men when the line under construction crosses the boundary between two districts.

Available statistics show that the average contract-construction pipe-line employe injured had been working less than 1 month on the job where he sustained his injury. Thirty-seven per cent of the cases were injured during their first week of work and 78 per cent were injured in less than 3 months. While laborers have done similar work previously, they are still in danger as they must accustom themselves to changed procedures and must develop teamwork with a new group of workers. There is also the danger that a new man will make an error which will cause an injury to a fellow employe. Not only the attention of the foreman, but all experienced men on the line must help in guiding the new employe if he is to be prevented from injuring himself or a co-worker.



Right-of-Way Hazards

There are two main dangers to employes of the right-of-way gang which produce a unique type of industrial injury. One is poisoning due to contact with ivy, oak or other plants which cause a skin infection, and the other is snake bite. The former, while occurring frequently, actually results in few lost-time cases but does cause a reduction in the efficiency of the employe. Snake bite not only causes loss of time but can also result in death. One company which is insuring a pipe-line construction firm building a line through snake-infested country in the South has supplied the crews with snake-bite kits. Men are also warned to be on the lookout.

Where large-diameter pipe is used there are demands for a wider right-of-way than has been customary. In some places, the right-of-way may need to be as much as 100 ft.

Coating and wrapping of pipe is not particularly dangerous although a number of accidents result from this work. Generally these are incurred by inexperienced men in the gang. After the crew has been properly organized and trained, these accidents are reduced.

When it is remembered that pipe lines traverse many pieces of property and cross highways and railroads it is remarkable that there are so very few injuries to the public. A minor fact which causes the claims department considerable discomfiture is the failure of the pipe-line crews to close gates. Claims for strayed and injured livestock can be averted in most cases if crews are instructed on this point.

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This is the viewpoint Lone Star Gas Company has held for 31 years of its existence. For this reason we have always insisted that the money paid Lone Star for service should be spent, first of all, for those things that are necessary to provide prompt, efficient and dependable service—when and where needed. This includes adequate, sound investments in plants, equipment and gas reserves; a trained and experienced organization to maintain and operate them; and a progressive, capable management to direct so vital an undertaking. In this way we have been able to increase Lone Star efficiency and hold rates down to a constant low level.

If you need fuel for power, whether in a factory turning out defense materials or in the field drilling an oil well, this "put yourself in her kitchen" policy has advantages for you, too. An inquiry addressed to Industrial Department, Lone Star Gas Company, Dallas, will bring you a complete outline of these advantages.

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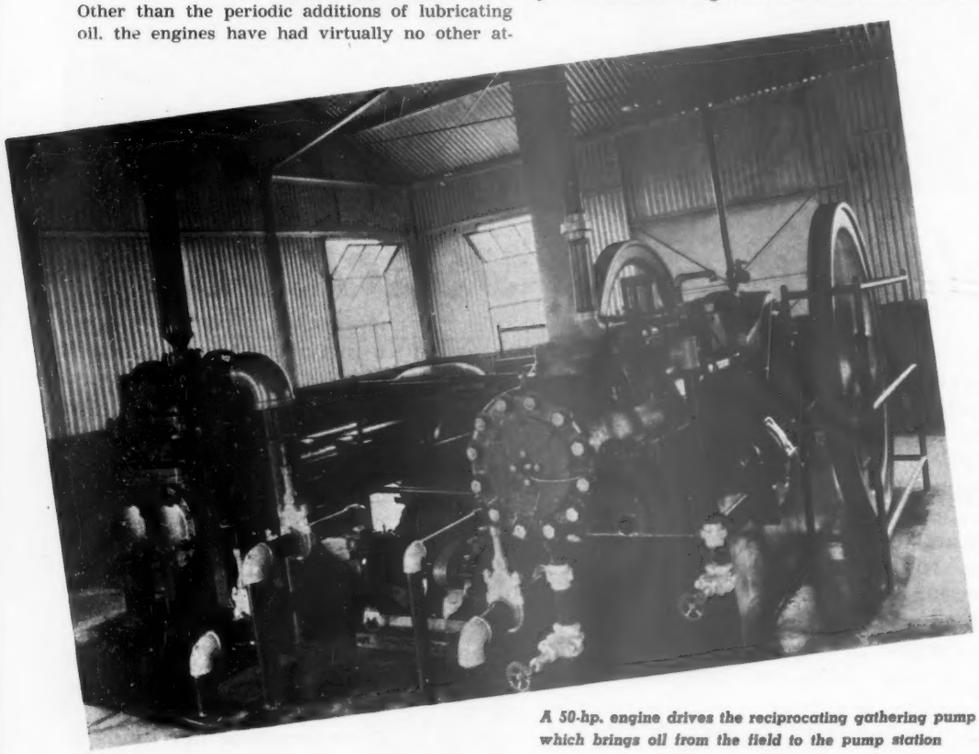
Two Engines Pump 7,000,000 Barrels of Oil in Three Years

THREE years ago the Republic Pipe Line Co. built a new pump station at East Whitepoint, Tex. G. E. Casey was in charge of the installation and operation of this station from its beginning to the present time, and Chief Engineer O. E. Sanders has had direct charge of the plant from the start. In these 3 years since its installation more than 7,000,000 bbl. of crude oil have been pumped from the surrounding field through a 6-in. line across the bay to Corpus Christi, 6 miles away.

Believing that the two essential factors in the power units for pipe-line service are a maximum of rugged dependability and a minimum of maintenance, Republic selected for the Whitepoint station two horizontal, two-cycle Superior engines, convertible for either oil or gas fuel. In this instance gas is used, as there is an abundant supply available and it is deemed more economical.

Pumping the 7,000,000 bbl. in 3 years the station has experienced no enforced shut downs and there have been no engine repairs whatsoever. Other than the periodic additions of lubricating oil, the engines have had virtually no other attention. Recently it was deemed advisable to remove the cylinder heads and pull the pistons on both engines for an inspection and check for corrosion. Cylinders were found to be in perfect condition and did not require cleaning. Rings were also in excellent shape and not one was frozen.



A 50-hp. engine drives the reciprocating gathering pump which brings oil from the field to the pump station

There are two engines in this station, driving three pumps. A single-cylinder, horizontal unit of 13¼-in. bore and 16-in. stroke, developing 50 hp. at 200 r.p.m., drives directly a reciprocating suction pump which gathers oil from all parts of the field and brings it to the station where it is picked up by the main-line pumps. The major power unit in the plant is a two-cylinder, horizontal engine of 15-in. bore and 18-in. stroke, developing its rated 160 hp. at 225 r.p.m. When first installed, this engine drove directly a 5 by 18-in. reciprocating pump discharging oil into the line. Some time later, the company decided to increase the pumping capacity of the plant and considered the possibility of installing a third engine. Since pumping pressure was considerably lower than that which had been contemplated when the plant was designed, it was found that the large engine had sufficient surplus power to handle a second pump. Consequently, another 5 by 18-in. reciprocating pump was connected to the other side of the crankshaft. The station now has a well-balanced pumping unit with one pump driven from each end of the engine shaft. Both pumps discharge into a common line with pressure at 200 lb. Volume is now 800 bbl. an hour.

Though the engines are not identical, the major features of design are the same. Both are of the crosshead type with consequent lessening of wear on cylinders and piston rings. A layshaft, gear driven from the crankshaft, drives, in turn, the governor, lubricator, magneto, and air-starting valves. All gears and cams are contained in a box which is constantly flooded with lubricating oil. The main bearings, crosshead, and connecting-rod bearings are lubricated by the splash system. The crankpin bearings are assured adequate lubrication by the splash system. The force-feed, mechanical lubricator supplies oil to three points on the perimeter of each cylinder and, in addition, sends oil to the governor. An important element of the design is an oil-settling chamber just behind the crosshead guides. Contaminating material collected in the chamber can be drained by means of a valve and is not allowed to reenter the lubricating system. This permits long runs without draining the crankcase.

Gas reaches the plant at 1,100 lb. pressure and passes through three regulators before reaching the throttling valve. On the large engine this valve is attached to an intake manifold connecting the two cylinders, while on the small engine the valve is attached directly to the base where it matches an opening into the body of the mixing valve. In both cases, the governors control the throttling valves and, therefore, the quantity of gas admitted to the cylinders. A rotary magneto is used to fire the two-cylinder unit while the other engine is served by an igniter.

The cooling-water system is of the closed type. Water is circulated by two centrifugal pumps driven by V-belts from a pulley on the main shaft of the large engine. One pump puts water through the engine jackets and the coils of an atmospheric-type cooling tower. The other pump takes water from the tower sump and sprays it over the coils. Makeup is secured from the city supply of Taft, Tex., a nearby town.

Comressed Air Starts Engine

Exhaust gases from each of the three power cylinders in the plant are piped directly to individual silencers. Both engines are started by compressed air supplied by a compressor V-belted to a small gasoline engine. Lighting for the plant is provided by a gasoline-engine-driven generator.

No cheaper or more efficient method could have been found for delivering the products of the oil field to Corpus Christi where it is loaded on tankers for shipment to the refineries. In 3 years, maintenance costs for the pump station have been virtually nonexistent. The fuel gas is a cheap, oil-field byproduct. The engines have given better than 5,000 hp. hrs. of service for every gallon of lubricating oil consumed. Republic has found the natural-gas engine and its oil-engine counterpart a trouble-free and economical source of power.

WHITEPOINT PUMPING STATION
PRINCIPAL EQUIPMENT

Engines	One 160-hp., two cylinder, 15 by 18-in., 225 r.p.m., two-cycle, horizontal gas engine, and One 50-hp., one cylinder, 13¼ by 16-in., 200 r.p.m., two-cycle, horizontal convertible gas engine. Superior, National Supply Co.
Main pumps	Worthington Pump & Machinery Corp. National Transit Pump & Machine Co.
Gathering pump	Gaso Pump & Burner Mfg. Co.
Mechanical lubricators	McCord Radiator & Mfg. Co.
Magneto	American Bosch Corp.
Igniter	Wico Electric Co.
Silencers	Maxim Silencer Co.
Cooling-water pumps	Goulds Pumps, Inc.
Air compressor	Curtis Compressor Co.
Lubricating oil	Republic Oil & Refining Co.
Gas regulators	Fisher Governor Co. Chaplin-Fulton Mfg. Co.

PIPE LINE SERVICE CORPORATION

FRANKLIN PARK, ILLINOIS PHONE FRANKLIN PARK 2345

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"A Decade of Progress"

PIPE LINE SERVICE CORPORATION was organized in February, 1931, by individuals who had, for a number of years, studied and recognized the necessity for improved methods of protecting underground pipe.

For the past ten years our efforts have been directed toward the improvement of equipment and facilities for better service to the pipe line industry. The expansion of our business has continued since its organization with very little publicity other than that created by satisfied customers who have recognized the merits of the high quality service rendered by our organization. For this recognition, we are very grateful.

PIPE LINE SERVICE CORPORATION have today the most extensive service in the United States for coating and wrapping pipe. Our facilities are sufficiently flexible to fit in with your requirements.

We take this opportunity to express to the industry our appreciation of the splendid cooperation we have received which has made our progress possible. We pledge ourselves at all times to give you the highest type of service available by well-trained personnel. This is your service and we invite your suggestions and criticisms.

PIPE LINE SERVICE CORPORATION

CHICAGO, ILLINOIS . . NEW YORK CITY . . LONGVIEW, TEXAS . . GLENWILLARD, PA.

New Arc-Welding Practices In Pipe-Line Construction

By A. F. DAVIS
Vice President, Lincoln Electric Co., Cleveland, Ohio

SEVERAL new practices are to be noted in present-day procedure in the construction of pipe lines by arc welding.

These new practices are:

1. Increasing use of plain butt joints welded without backing-up ring in large diameter pipe.
2. Use of high-tensile steel pipe.
3. Increasing use of diesel engine-driven arc-welding machines.

On the pipe lines completed or under construction during 1941 by H. C. Price, Inc., Bartlesville, Okla., shown in the accompanying tabulation, no backing-up rings were employed. All of the lines tabulated were solid welded using plain-end pipe.

Accompanying illustrations show welding operations on 1941 projects: Fig. 1—14-in. line in Illinois; Fig. 2—26-in. line in Kansas; Fig. 3—14-in. line in Louisiana.

Probably the most radical change during 1941 was in construction of the 26-in. gas line for the Natural Gas Pipeline Co. of America, having a total length of 310 miles, constructed in Iowa and Nebraska.

The pipe, of high-tensile steel, had a wall thickness of only ¼ in. All joints were welded with "Shield-Arc 85" Lincoln electrodes, manufactured particularly for welding high-tensile steel in all positions. The joint metal has the following properties:

PROPERTIES OF WELDS IN HIGH-TENSILE STEEL

Tensile strength, tons per sq. in.		Yield point, tons per sq. in.		Ductility, elongation in 2 in.	
As welded	Stress relieved	As welded	Stress relieved	As welded	Stress relieved
34 to 36 tons	33 to 36 tons	27 to 29 tons	26 to 29 tons	20% to 24%	25% to 30%

The joints in this high-tensile steel pipe were welded in three beads using 5/32-in., $\frac{7}{64}$-in. and ¼-in. electrodes. The current ranges for each size were 100 to 160 amp., 125 to 180 amp. and 190 to 325 amp., respectively.

Another change noted on this line in addition to smaller size electrodes was use of factory bends in place of field bending. It was reported that this departure greatly increased the speed of construction on this line.

Still another change resulting from introduction of light-wall pipe of high-tensile steel was introduction of special ground cables. These cables, one of which can be seen in Fig. 4, are used to eliminate any possibility of sparking against the steel of the pipe.

Of the 1,023 miles of arc-welded pipe under construction during 1941, 369 miles were welded by the stovepipe method in which each joint is welded individually, and 579 miles by the firing-line method. One line, 75 miles long, built for the Stanolind Pipe Line Co. and Sinclair Pipe Line Co.

Fig. 1 (upper left): Firing-line welding on 14-in. pipe line near Wilmington, Ill. Fig. 2 (upper right): Lining up pipe and tack-welding joints on 26-in. gas line in Kansas. Fig. 3 (lower left): Roll-welding on 14-in. pipe line in Louisiana. Fig. 4 (lower right): Use of special ground cable and clamp to eliminate sparking

ARC-WELDED PIPE LINES COMPLETED OR UNDER CONSTRUCTION DURING 1941

(Data from H. C. Price, Inc., Bartlesville, Okla.)

Work Completed During 1941

Owner—	General contractor	Size pipe (in.)	Length miles	Location	Type of construction
Consumers Power Co.	Dowding Truck & Transfer	12	40	Near Clara, Mich.	S.P.
Kaw Pipe Line Co.	Fredell Construction Co.	8	20	From Gorham, Kans., to Bemis pool	S.P.
Toronto Pipe Line Co.	Sheehan Pipe Line Con. Co.	4-6	29	Near Mount Carmel, Ill.	S.P.
Stanolind Pipe Line Co. and Sinclair Pipe Line Co.	Sheehan Pipe Line Con. Co.	8-10 12-14	75	Near Wilmington, Ill.	F.L. & S.P.
Pure Oil Co.		5-6	7	Near Olney, Ill.	S.P.
Buckeye Pipe Line Co.	Sheehan Pipe Line Con. Co.	6-8	23	Near Ravenna, Ohio	F.L.
Illinois Pipe Line Co.	Sheehan Pipe Line Con. Co.	10	27	Near Bridgeport, Ill.	F.L.
Stanolind Pipe Line Co.	B & M Construction Co.	8-12	75	From Belcherville, Tex., to Pauls Valley, Okla.	S.P.
Stanolind Pipe Line Co.	Oil States Construction Co.	12	40	24 miles near Carrollton, Mo., and 16 miles near East Fort Madison, Ill.	S.P.
Illinois Pipe Line Co.	Sheehan Pipe Line Con. Co.	8	40	Near Bridgeport, Ill.	F.L.
Work Under Construction					
Southern Natural Gas Co.	B & M Construction Co.	14	130	From Logansport to Perryville, La.	F.L.
Natural Gas Pipeline Co. of America	W. A. Bechtel Co.	26	121	33 miles from Stinnett to Spearman, Tex., and 88 miles from Meade to Kinsley, Kans.	F.L.
Natural Gas Pipeline Co. of America	O. E. Dempsey Construction Co.	26	101	In Iowa and Nebraska	F.L.
Natural Gas Pipeline Co. of America	W. A. Bechtel Co.	26	88	In Iowa	F.L.
Natural Gas Pipeline Co. of America	W. A. Bechtel Co.	20	24	River crossings in Iowa	F.L.
Illinois Pipe Line Co.	Sheehan Pipe Line Con. Co.	8-10	25	Near Enfield, Ill.	F.L.
Illinois Pipe Line Co.	Sheehan Pipe Line Con. Co.	6	25	Near Lebanon, Ind.	S.P.
Stanolind Pipe Line Co.	Sheehan Pipe Line Con. Co.	8	133	From Indianapolis to Hammond, Ind.	S.P.

S.P.—Stovepipe method. F.L.—Firing-line method. All of the above lines were solid welded using plain-end pipe.

near Wilmington, Ill., of 8, 10, 12 and 14-in. pipe utilized both methods.

Diesel engine-driven arc-welding outfits are being employed increasingly in pipe-line construction. Developed by Lincoln engineers, in conjunction with manufacturers of diesel engines, these units are comparable with gas engine-driven sets in weight and operating speed. By making the inherent economies of diesel operation available in pipe-line construction, these machines have reduced pipe-line welding costs, making the advantages of arc-welded construction greater than ever.

Maverick Springs Outlet

W. T. Ross, of Riverton, Wyo., and Minneapolis, Minn., has been granted a certificate by the Wyoming Public Service Commission for the construction of a 34-mile 8-in. pipe line costing $215,000 from the Maverick Springs field, Fremont County, Wyoming, to rail heads at Shoshoni, on the Chicago & Northwestern Railroad, and at Bonneville, on the Burlington railroad. There will be a 4-mile extension to the Circle field. Maverick Springs was discovered in 1918 and has been shut in until a year ago when operators worked out an agreement with the Department of the Interior to place the field on production.

Fargo Pump Station

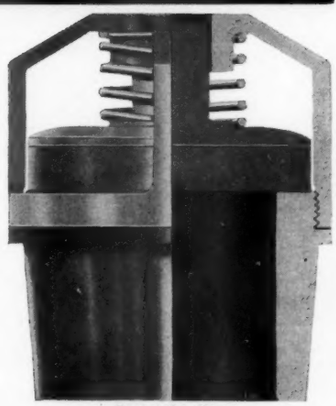
In the Fargo field, Texas, ground is being prepared for the construction of a pump station for the 4 and 6-in. pipe line Bell-Western Corp. is laying from its Grandfield, Okla., refinery across Red River to the field.

A pump station, two oil tanks with capacities of 3,000 and 5,000 gal. and a company house will be erected on a 6-acre tract in the east central part of Section 36, Block 15, H.&T.C. Survey.

L-K PUMP VALVES

L-K SIMPLEX CAGE TYPE PUMP VALVE

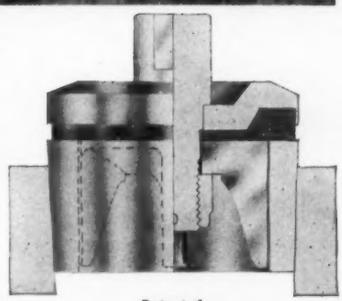
Above—240 L-K Simplex Cage Type Pump Valves ready to be boxed for shipment to one major pipe line company on one order. This company already has 906 of these valves in service and we are now manufacturing 536 additional ones to complete two more orders for them.



Patent Pending

L-K REGULAR TYPE PIPE LINE VALVE

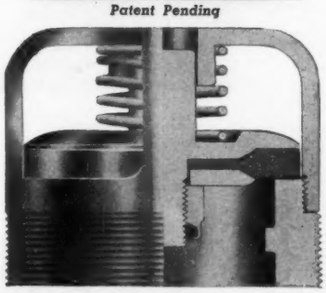
Above are shown 252 L-K Regular Type Pump Valves ready to be boxed for shipment for installation in one pump. One company has 1992 of these valves in 14 pumps. On November 1, 1940 they had run a total of 239,227 operating hours, over a three-year period, with a total replacement cost of $436.96, an average of $10.40 per pump per year. At the present time the average expense is no greater than it was last November.



Patented

L-K REGULAR CAGE TYPE PUMP VALVE

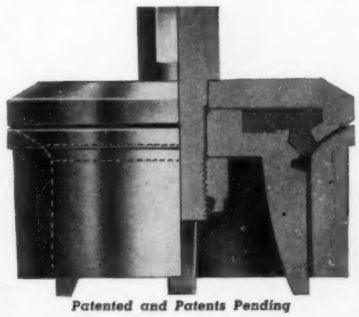
Right—L-K Regular Cage Type Pump Valves for Boiler Feed, Pickup and Refinery Service have proven highly satisfactory and in addition to cutting replacement costs many times, they have also greatly increased pump efficiency.



Patented

L-K INNER SEAL PUMP VALVE

L-K Inner Seal Pump Valves are designed for Cementing, Core Drilling and Small Slush Pump Service. They have been in service on pressures ranging up to 5600 lbs. pressure and have many satisfied users.



Patented and Patents Pending

Let us figure on your next Pump Valve Installation. We believe we can lower your replacement costs and increase your pump efficiency.

OTHER PRODUCTS

Various Pump Parts; Fabricated Bakelite Parts (Phenolic Laminated Sheet); Gears and Sprockets; Spining Line Swivels; L-K Cementing Plugs (For Cementing Casing); L-K Tubing Plugs (For plugging back and squeeze jobs).

L-K PUMP VALVE CO. L-K HOUSTON TEXAS

L-K PUMP VALVE COMPANY

P.O. BOX 901 — 634 N. EDGEWOOD STREET • HOUSTON, TEXAS

Ashore and Afloat Pan-American Prefers ATLAS

REPEAT ORDERS, based upon satisfactory performance records of engines in service, plus confidence the engine builder gained through previous purchase —that is the brief story behind the preference of Pan American Petroleum & Transport Company for Atlas Imperial Diesel Engines.

During the five years of 1936 to 1940, they bought five slow speed, heavy duty Atlas Marine Diesels to power five new tug boats for transporting oil on the Intracoastal Waterways, and they found them uniformly satisfactory for reliability, economy of operation, and low maintenance.

So when it came to the selection of engines to power four pipe line pumping stations on their new line from East Texas to Texas City on the Gulf, they had experience to draw upon—and they bought eight 400 H.P. Stationary Atlas Diesels of the same general type they had used so successfully afloat.

PAN I

Built in 1936 by Pennsylvania Shipyards, Inc., and powered by a 275 H.P. Atlas Diesel.

PAN II

Built in 1937 by Levingston Shipbuilding Co., and powered by a 380 H.P. Atlas Diesel.

PAN III

Built in 1937 by Levingston Shipbuilding Co., and powered by a 380 H.P. Atlas Diesel.

PAN IV

Built in 1938 by Levingston Shipbuilding Co., and powered by a 380 H.P. Atlas Diesel.

PAN V

Built in 1940 by the Levingston Shipbuilding Co., and powered by a 400 H.P. Atlas Diesel.

ATLAS IMPERIAL DIESEL ENGINE C

EASTERN DIVISION . . . . 115 BROAD STREET, NEW YORK, N.Y.
CENTRAL DIVISION . . . . 228 NO. LA SALLE ST., CHICAGO, ILL.
SOUTHWESTERN DIVISION . . . 5726 NAVIGATION BLVD., HOUSTO
WESTERN DIVISION . . . . 1000 NINETEENTH AVENUE, OAKLA

INDUSTRIAL • MARINE • STATIONARY

Features of Station Equipment On Pan American Pipe Line

By A. J. RABE
Engineer, Pan American Pipe Line Co.

EARLY this year Pan American Pipe Line Co. completed and put in operation a 196-mile crude-oil pipe line between Longview and Sinco, Tex. The line consists of 57.89 miles of 10-in. pipe between the Sabine station near Longview and the Douglass station, 47.73 miles of 12-in. between Douglass and Livingston stations, 67.87 miles of 12-in. between Livingston and San Jacinto stations and 12.97 miles of 12-in. between San Jacinto and the Sinco station where the trunk line joins the 33-mile system which the company has operated for a number of years for the transportation of oil in the Houston area to the refinery at Texas City.

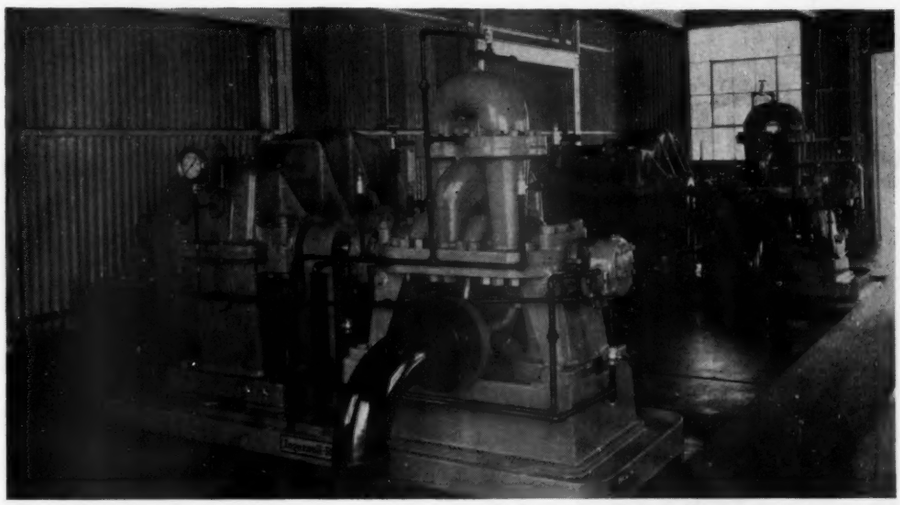
The line was built for the purpose of transporting oil from the company's gathering system in East Texas as well as oil from the Cayuga field. Cayuga oil is transported through arrangements made with Texas Pipe Line Co. for a distance of 65 miles to the Douglass station on the new Pan American line. The Douglass station is a junction point for two grades of oil.

Deliveries from the Douglass station to Texas City can be made at the following rates: East Texas crude 56,000 bbl. daily; Cayuga crude 45,000 bbl. daily.

Four Stations Similarly Equipped

The four pump stations have been designed and equipped in a similar manner. These stations represent the largest construction of pumping facilities on any line completed and put in operation this year. For this reason they have drawn the attention of men in the industry concerned with pipe-line operation.

A description of a typical station will serve to show the provisions which have been made for pumping facilities. Buildings consist of the main pump-station building, office, auxiliary building, warehouse and garage. The station is equipped with two 400-hp., common-rail, four-cycle diesel engines. Circulation water pumps and electrical generator are driven from V-belt pulleys on the engine shaft. Maxim silencers are used on the exhaust of each engine. Normal operating speed is from 280 to a maximum of 327 r.p.m. All of the oil used for diesel fuel is cleaned by a cen-



Above: Two four-stage centrifugal pumps are connected with 10-in. suction and 8-in. discharge lines

Right: Two 400-hp. common-rail, four-cycle diesel engines operate at speeds varying between 280 and 327 r.p.m.

Below: Heat exchangers and discharge line for cooling engine-jacket water.

In the auxiliary building are placed all equipment which represent fire hazards

trifugal fuel-oil purifier which removes grit and other impurities which cause abrasion, and interfere with efficient operation of the engines. East Texas crude is used for diesel fuel at these stations.

There is ample space and sufficient light in the engine room so that the work of operating and maintaining the engines may be carriel on under proper conditions. Engines are separated from pumps by a fire wall. Each engine drives a four-stage centrifugal pump. Shaft speed is stepped up approximately 10 to 1 through gears. Manifolds have been installed at the 10-in. suction and 8-in. discharge lines. Units may be operated separately or they may be compounded.

All pieces of equipment which represent fire hazards have been removed from the engine room and the pump rooms; they are located in a separate auxiliary building. An internal-combustion engine running on butane fuel furnishes auxiliary power and light from its direct-connected generator. A fuller's earth filter oil reclaimer operates continuously. This rids the diesel engine lubricating oil of acids and sludge. Crude oil for fuel purposes is taken from the third stage of the main-line pumps into a 250-bbl. vertical tank. The oil from this tank is heated by a small steam heat exchanger to approximately 95° F. before entering the centrifugal oil purifier. On leaving the purifier this oil goes to a 250-bbl. clean fuel-oil tank. A plunger-type sump pump is electrically driven; it injects the sump-pit oil into the main suction upstream from the main-line strainer. An electrically driven air compressor furnishes starting air for the diesel engines and pressure for the water-supply tank. A special cubicle is provided for central control of lighting and power. Power and lighting buses are arranged so that both main generator and auxiliary generator can be used on either one or the other of the two buses. Special interlocking switches prevent the use of both generators on the same bus.

The temperature of engine-jacket cooling water is reduced to 120° F. by passing through two exchangers installed in the discharge line at a short distance from the station. Jacket water is cooled by crude oil moving through the main line. Normally both heat exchangers are in operation at all times. Manifolds and gates make it possible to bypass either heat-exchanger unit. Heat exchangers have been installed in accord with modern practice. Good working conditions around the exchangers are insured by gravel flooring retained in place by concrete curbing. Similar gravel flooring and curbing is used at the suction manifold. Concrete foundations raise the heat exchangers high enough from the ground so that repair work is facilitated. The installation has been planned so that trouble in one of the heat exchangers can be readily taken care of without seriously impairing the operation of the line. Other equipment outside the main pump station building includes the two air compressor tanks and the 250-bbl. fuel-oil tanks.

Near the suction manifold a streamlined basket-type strainer is installed on the main line. The strainer has a quarter-mesh basket which reinforces a 40-mesh screen. A single pressure gage is connected by manifold to piping, leading to both sides of the strainer in order that the pressure on each side of the strainer may be determined satisfactorily by station operators.

A unique type of scraper trap is used. The scraper is received by lowering the trap, consisting of two rods operated by a rising stem and handwheel, on the downstream side of the scraper trap. The sending scraper is released by raising the rods. The receiving and sending of scrapers is entirely by main-line pressure.

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Furnished All the Sectional Steel Buildings used on the NEW 200 MILE PIPE LINE

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WRITE FOR LITERATURE

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OIL FIELD DISTRIBUTOR FOR WISCONSIN ENGINES AND ALL TYPES OF QUALITY MOTORS

Develop New System for Synchronizing Pumps

By W. W. MITCHELL
Division Supervisor, Tide Water Associated Oil Co., San Joaquin Valley Pipe Line System

EARLY in 1940, the San Joaquin Valley Pipe Line System, of the Tide Water Associated Oil Co., San Francisco, Calif., desired to eliminate the necessity of manually controlling the main-line pump speed and the necessity of using "floating" or balance tanks at each station with sufficient storage to allow for wide variations in throughput of a given station with respect to the preceding station.

Under the old system it was necessary for the operator in attendance at the station to manually control the pump speed. As the liquid level in the balance tank rose, the speed of the pump had to be increased by manually hanging the steam throttle valve to maintain level in the balance tank within a given range in order to maintain the reasonably accepted and desired suction pressure to the pumps and by so doing keep the entire pipe-line system in balance.

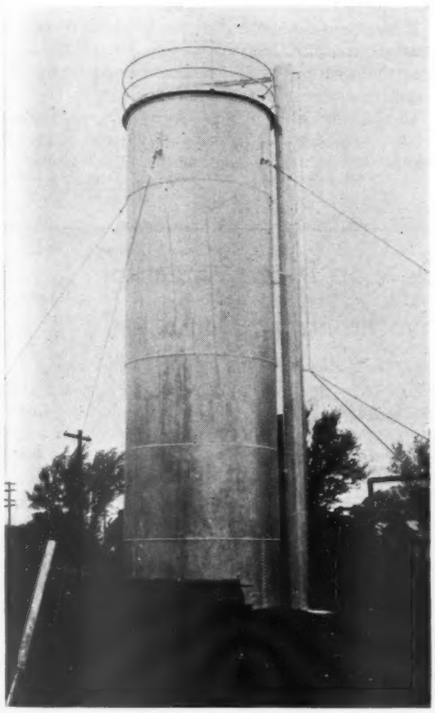


Fig. 1 (above)—The use of a large "balance" tank was eliminated and for it was substituted an 18-in. standpipe 40 ft. high which was installed adjacent to the balance tank at the Trent station

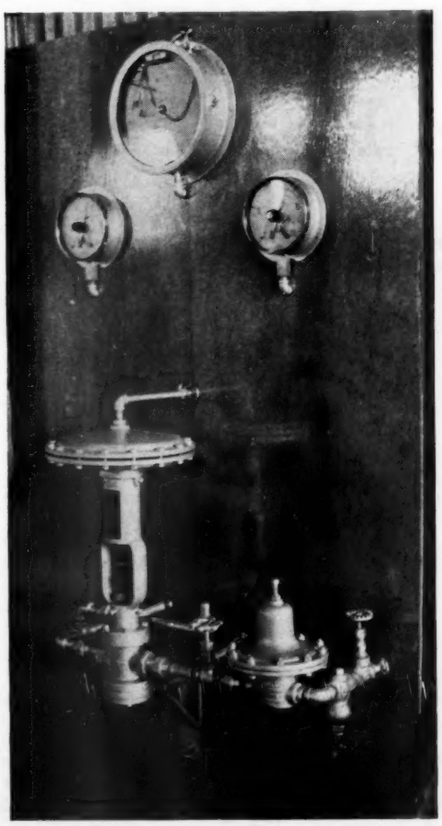
In the design worked out for the San Joaquin Valley Pipe Line System they first eliminated the use of a large "balance" tank, in place of which was installed an 18-in. standpipe, 40 ft. high, as illustrated in Fig. 1. The standpipe is adjacent to the old balance tank, illustrating the savings in size and resultant initial investment cost, as well as maintenance costs and evaporation losses.

The standpipe is connected to the suction side, or intake side, of the station and the function of this standpipe is merely to reflect a fluid head change, which is changed as suction pressure to the station varies. If the preceding station has increased its pumping rate, this will be reflected in an increase in suction pressure, the fluid level in the overshot standpipe will rise. In the event the preceding station has decreased its pumping rate, the fluid level in the overshot standpipe will fall, due to a lower suction pressure being supplied to the station, provided no change in pump speed is made at the station.

The change of liquid level creates a change in static pressure, which is picked up by a control-valve system operating a diaphragm valve located in the main steam line to the pipe-line pump.

Remoteness Forces New Practice

As the stations on the pipe line are remotely located and neither air nor dry natural gas is available for operation of the control equipment, it necessitated the use of some other medium to operate the control system. There was available and present at each station a positive boiler-feed water-pressure system and it was decided to use this fluid and this pressure to operate the control valve.



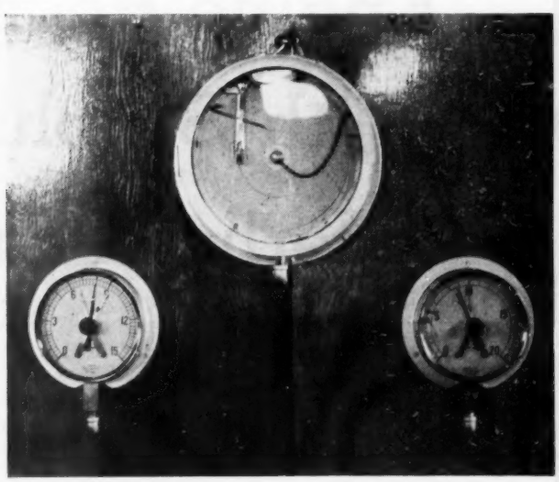
Photographs courtesy Fisher Governor Co.

The variation in head in the overshot standpipe was connected to and brought to the diaphragm of a diaphragm-actuated pilot control valve as illustrated in Fig. 2. The operating medium for actuating the main diaphragm valve in the steam line passed through this pilot valve, being maintained at a constant pressure of 20 lb. per sq. in. ahead of the pilot control valve through the use of the auxiliary operating medium-pressure regulator.

As the head of liquid in the overshot standpipe changed the pilot valve was actuated accordingly. An increase in head caused the pilot control valve to close and in so far as the pilot valve was used as a variable bleeder against the operating medium, when this valve started to close the pressure would build up behind it. This increase in pressure in turn was transmitted to the diaphragm of the steam throttle valve which in turn caused this valve to open, thereby increasing the pump speed. Therefore, the pump is speeded up in accordance with the increase in suction pressure which reflected an increase in throughput by the previous station. In such a manner the throughput of the station is exactly synchronized with that of the preceding station.

The general arrangement of the pilot-controlled main valve is shown in Fig. 3.

The main diaphragm valve was located in a bypass around the manual throttle valve and full control of the engine was on this automatic control, which in turn is actuated through the pilot control and by suction pressure at the station.



Figs. 2 and 3 (left and above)—Gages and governor assembly at Linora station. In the center is the overshot liquid level recorder; (left) overshot pressure gage; (right) diaphragm throttle pressure gage. All gages are equipped with adjustable "high-low" electric alarm contacts

Three different sizes of steam-operated straight-line horizontal duplex double-plunger main-line pumps are in use at the various stations on this system, namely, 18 by 28 by 48 by 9½ by 36,

(Continued on Page 198)

Showing hot-air heating-system installation in Twitty, Tex., compressor station of Consolidated Gas Utilities Corp.

Engine Rooms Heated With Surplus Heat From Overhead Exhaust Lines

By C. S. WORLEY
Consolidated Gas Utilities Corp., Oklahoma City, Okla.

THE matter of properly heating engine rooms and other plant buildings often becomes a major problem. Excepting in localities where the year-round temperature is mild, it is necessary to provide some sort of heating system for comfort of the operators and for the proper functioning of various instruments and other units of equipment.

At plants where oil is processed, or gasoline extracted, there is usually a surplus of steam-boiler capacity for heating purposes. In many other plants low-pressure boilers are installed for the heating systems. Also, there are some types of direct-fired heaters which have been approved by the underwriters but on account of the hazard involved, these have not been put into general use where high-pressure oil or gas is being handled.

It seems probable, however, that in most plants where internal-combustion engines are employed, sufficient excess heat is dissipated to make the engine rooms comfortable, even in severe winter weather, if it were properly conserved and distributed. This is entirely practical in plants having overhead exhaust lines, and the necessary installation can be made with a comparatively small investment.

In a gas-compressing plant of Consolidated Gas Utilities Corp. near Shamrock, Tex., where three 400-hp. angle-type gas-engine-driven compressors were installed in the fall of 1939, it was decided to utilize this excess heat from overhead exhaust lines. This was accomplished by covering the 10-in. vertical piping with 14-in. jackets of heavy galvanized iron, leaving an annular space of 2 in. between the exhaust pipe and the jacket. A wide-flaring apron was attached to the bottom of each jacket, extending out over the exhaust manifold to help collect the hot air. The top of each jacket was tapered in to fit the 10-in. exhaust pipe and packed off against the exhaust line just under the roof. This is clamped down against asbestos sheet packing to make a tight joint and to eliminate rattle and vibration.

These jackets are all connected near the top by 14-in. ducts into a 20-in. common duct or conveyor. This leads to the opposite side of the building and down into a housing which contains an exhaust fan. The fan has a capacity of 5,000 cu. ft. of free air per minute and is direct driven by a 2½-hp. electric motor. As a safety feature, a partition is provided between the fan and motor, and the drive shaft is packed off where it passes through this partition. At the outlet of the fan, which is 6 ft. above the floor, louvers are provided to control the direction of the discharged hot air to give proper distribution.

A shutter is also provided to discharge the air outside of the building, if it is desirable to do so, thus reducing the engine-room temperature in hot weather.

This heating system has now been in service two moderately cold winters and has proven to be adequate for comfort, excepting on a very few subzero days when a high wind prevailed. The building, of corrugated-galvanized-iron construction, is 24 ft. by 60 ft. by 18 ft. and has three 24-in. rotary-type ventilators, which are never closed even in the most severe weather.

It has been determined by repeated observations that on comparatively calm days, with the outside temperature at 0° F., the average inside the engine room has been about 60° F.

In the general layout of this system, the writer wishes to acknowledge the able assistance of the company's industrial engineer, J. W. Duvall.

Develop New System for Synchronizing Pumps

(Continued from Page 197)

24 by 42 by 9½ by 36, and 22 by 38 by 9½ by 36. These pumps were equipped with an overriding, safety-speed-limit control to avoid running away and causing damage in the event discharge pressure on the station was completely lost.

On the control board in the station, in addition to the pilot-operated controller, three gage members are located on the board, as shown by Fig. 3. The center recording-pressure gage records the suction pressure or standpipe level height at the station. The left-hand gage also indicates the head pressure in the standpipe and is equipped with high and low electric-alarm contacts to warn operator of unusual high or low level in standpipe. The third, or right-hand, gage indicates the pressure being supplied to the diaphragm control valve from the pilot controller and is also equipped with adjustable high and low contacts in order to warn the operator if any radical change in operating conditions occur. This is in order that he may check for line trouble, etc., also in order that he may check and ascertain that the boilers, auxiliaries, etc., have been properly adjusted to meet the changed operating conditions.

The entire system is of "Fail-Safe" design, that is, in the event of loss of operating medium or of failure of any part of the control system, the main-line pumps are immediately shut down and an alarm is sounded to call the condition to the operator's attention. In such cases the line flow is automatically taken on into the large balance tank until such time as the trouble is rectified.

So successful was the first installation, which was placed in operation in June, 1940, an additional nine station have been placed under the same type of control since that time, with highly satisfactory results.

Personnel of Crude-Oil Pipe-Line Companies

The companies listed are confined largely to operators of crude-oil trunk lines and do not include several gathering systems operated by refinery companies in close proximity to their plants. For personnel of refining companies see survey in issue of March 27, 1941

A

Ajax Pipe Line Corp., Box 801, Tulsa, Okla.

William A. McAfee, *Pres.* Rawleigh Warner, Paul Griffin, *V. P.s.* M. E. Newcomer, *Sec.* W. J. Semple, *Treas.* S. V. Kane, O. W. Bailey, *Asst. Treas.* C. L. Bushnell, *Asst. Sec.* S. L. Westlake, *Mech. Engr.* J. R. Doles, *Supt.;* W. S. Dyer, *Supt. Tel. & Tel.;* C. P. Morgan, *Master Mech.,* Landers Bldg., Springfield, Mo. 787 miles, 10-in.

Alamo Pipe Line Co., 808 Frost National Bank Bldg., San Antonio, Tex.

Edwin M. Jones, *Pres.* Harry Ezzell, *V. P., Sec.* and *Treas.* E. C. Rach, *V. P.* Mrs. Marguerite Sellers, *Asst. Sec.;* Kenneth Wimer, *Asst. Treas.,* San Antonio. R. A. Tyler, *Field Supt.;* Chas. E. Osborne, *Loading Supt.,* Three Rivers, Tex. 27 miles, 4 to 10-in.

American Liberty Pipe Line Co., First National Bank Bldg., Dallas, Tex.

T. L. Wynne, *Pres.* C. W. Murchison, *V. P.* V. H. Maxwell, *Sec.* D. R. Zachry, *Treas.* L. P. Carter, *Gas Supt.* and *Pur. Agt.* F. M. Coker, *Ch. Engr.* B. Mitchell, Kilgore, Tex., B. I. Smith, Houston, *Supts.* 250 miles, 6 and 8-in. 200 miles gathering lines.

American Petroleum Co. (of Texas), Petroleum Bldg., Houston, Tex.

G. O. Irvine, *Pres.* T. J. Arnold, *V. P.* G. L. Townsan, *Sec.* C. T. Carnes, *Treas.* J. M. Cook, *Sales Mgr.* J. H. Bringhurst, *Ch. Engr.* W. G. Freitag, *Pur. Agt.* S. J. Bell, *Supt. Ref. & P. L.* H. P. Sellers, *Ch. Chem.* 62 miles, 6-in.

Amsco Pipe Line Co., Box 870, Corpus Christi, Tex.

John D. Manley, *Pres.* John A. Bartlett, Ward C. Pearl, *V. P.s.* F. R. Lowrey, *Sec.* and *Treas.* A. R. Delsman, *Asst. Sec.* and *Treas.* J. U. Shepard, Jr., *Supt.* Fred Geiger, *Oil Run Dept.* T. E. Johnson, *Asst. Supt.* 76 miles, 4 to 6-in.

Anderson-Prichard Pipe Line Corp., 1000 Ramsey Tower, Oklahoma City, Okla.

L. H. Prichard, *Pres.* P. H. Anderson, *V. P.* and *Treas.* J. Steve Anderson, *V. P.* T. H. Marshall, *Sec.* George H. Burruss, *Gen. Mgr. Ref.* Weston Payne, *Mgr. Oklahoma City Div.* J. C. Bradley, *Mgr. Cyril Ref.;* John Bates, *Supt. Cyril Div.,* Cyril, Okla. 110 miles, 2 to 6-in.

Arkana Transit Corp., Box 1129, Shreveport, La.

J. Frommer, *Pres.* D. W. Harris, *V. P.* J. P. D'Artois, *Sec.* W. F. Baldwin, *Treas.* E. B. Charlton, Haynesville, La., *Gen. Mgr.* 35 miles, 4 and 6-in.

Arkansas Fuel Oil Co., Oil Pipe Line Div., Shreveport, La.

T. W. Tutwiler, *Pres.* D. W. Harris, *V. P.* and *Gen. Mgr.* J. S. Sheffield, *Sec.* M. J. Lasseigne, *Treas.* G. L. Gano, *Mgr.* P. T. Thibodaux, *Asst. Mgr.* and *Opr. Supt.* J. H. Rehkopf, *Ch. Clerk.* H. R. Eanes, *Ch. Dispatcher.* J. I. Menefee, *P. L. Engr.* R. L. Waldron, Oil City, La.; C. O. Rhodes, Haynesville, La.; S. B. Sims, Tullos, La., *Dist. Supts.* 325 miles, 2 to 8-in.

Atlantic Pipe Line Co., Dallas, Tex.

E. J. Henry, *Pres.* R. C. Tuttle, L. M. Goldsmith, *V. P.s.,* 260 S. Broad St., Philadelphia. J. H. Wood, Jr., *V. P.* and *Gen. Mgr.* B. G. McKain, *Sec.* Paul Shuman, *Treas.* R. P. Paden, *Gen. Supt.;* C. M. Southern, *Asst. to Gent. Supt.;* J. W. Williams, *Ch. Oper. Engr.;* T. M. Hart, *Tele. Supervisor;* Curt Oppel, *Pur. Agt.,* Dallas. L. S. Mobley, Box 389, Port Arthur, Tex., *Supervisor of Terminals.* J. L. McGrew, Box 1190, Midland, Tex.; D. M. Blackstock, Box AA, Refugio, Tex.; T. L. Hare, Box 1031, Longview, Tex., *Div. Supts.* R. E. Love, Beaumont, Tex.; G. A. Bonge, Hearne, Tex., *Maintenance Supts.* 995 miles, 4 to 10-in.

Atlas Pipe Line Corp., 619 Market St., Shreveport, La.

B. F. Connolly, *Gen. Mgr.* H. M. Arthur, *P. L. Supt.* V. M. Chance, *Ref. Supt.* J. L. Polk, *Auditor.* H. K. Phelps, Jr., *Federal Trustee.* 34.54 miles, 8-in.

ABBREVIATIONS USED

Chm. Bd.—Chairman of Board
Pres.—President
V. P.—Vice President
Sec.—Secretary
Treas.—Treasurer
Gen. Mgr.—General Manager
Pur. Agt.—Purchasing Agent
Supt.—Superintendent
Ch. Engr.—Chief Engineer
Ch. Dispatcher—Chief Dispatcher
Dist. Mgr.—District Manager
Div. Mgr.—Division Manager

B

Baird Refining Co., Baird, Tex.

Sylvester Dayson, *Pres.* E. L. Woodley, *V. P.* and *Treas.* J. E. Bullock, *Sec.* 37 miles, 2½ and 4-in.

Barnsdall Pipe Line Co., Box 2039, Tulsa, Okla.

E. B. Reeser, *Pres.;* D. R. Snow, Ralph E. Sleppy, *V. P.s;* James A. Dunn, *Sec.;* E. M. Skeehan, *Treas.;* H. E. Ammerman, Victoria, Tex., *Supt.* 120 miles, 3 to 6-in.

Basin Pipe Line Co., Big Spring, Tex.

C. L. McIver, *Pres.* and *Gen. Mgr.* A. L. Lipscomb, Jr., *Sec.* and *Treas.* B. M. Blankenship, Denver City, Tex., *Sta. Engr.* 117 miles, 4 and 6-in.

Bay Pipe Line Corp., Bearinger Bldg., Saginaw, Mich.

Howard D. Atha, *Pres.* Edward Reiser, James C. Graves, *V. P.s.* T. G. Caley, *Sec.* and *Treas.* Edward Reiser, *Gen. Mgr.;* Jas. F. Ward, *Supt.,* Saginaw. Carl Mowry, *Foreman;* E. L. Park, *Sta. Engr.,* Beaverton. Flint Doane, Coleman, *Sta. Engr.* R. W. Thompson, Bay City, *Sta. Engr.* 73 miles, 4 and 6-in.

Bell Oil & Gas Co., National Bank of Tulsa Bldg., Tulsa, Okla.

Samuel L. Lubbell, *Pres.* Benedict I. Lubell, *V. P.* and *Treas.* M. L. Freese, I. A. Anson, *V. P.s.* Ben P. Piepgrass, *Sec.* B. F. Gilchrist, *P. L. Supt.;* L. W. Walling, *Sta. Engr.,* Burkburnettt, Tex. Louis Mack, Wichita Falls, Tex., *Const. Engr.* 105 miles, 2 to 6-in.

Ben Franklin Refining Co., 1310 National Bank of Tulsa Bldg., Tulsa, Okla.

I. A. Anson, *Pres.* M. L. Freese, *V. P.* Benedict I. Lubell, *V. P.* and *Treas.* Ben Piepgrass, *Sec.* E. S. Horner, Ardmore, Okla., *Supt.* R. L. Barnard, Healdton, Okla., *Dist. Foreman.* Louis Mack, Wichita Falls, Tex., *Const. Engr.* L. Z. Watson, Healdton, Okla.; W. C. McPherson, Oscar, Okla., *Station Engrs.* 83 miles, 2 to 6-in.

Big Spring Pipe Line Co., Big Spring, Tex.

Jos. Edwards, *Pres.* R. T. Piner, *V. P.* G. H. Hayward, *Sec.* and *Treas.* J. Henry Edwards, *Supt.* 16 miles, 4-in.

Bryson Pipeline & Ref. Co., Inc., 614 Waggoner Bldg., Wichita Falls, Tex.

O. R. Tipps, *Pres.* C. J. Bohner, *V. P.* Glenn Bear, *Sec.* and *Treas.* Rex Young, *Ref. Mgr.* Clyde Hall, *Supt. Ref.* Knox Garvin, *P. L. Supt.* 100 miles, 2 and 4-in.

Buckeye Pipe Line Co., The, 137 West North St., Lima, Ohio

G. E. Pifer, *Gen. Mgr.* H. K. Floyd, *Asst. Gen. Mgr.* L. A. Miller, *Supt.* C. W. Tomford, *Asst. Supt.* F. J. Callahan, H. L. Pew, *Asst. Sec.* H. W. Taylor, J. D. Bailey, *Engrs.* J. R. McNeff, *Oil Dispatcher.* W. C. Ludwick, *Supt.;* Grant Barbee, *Asst. Supt.;* F. R. Smith, R. E. Soules, *Dist. Foremen,* Marietta, Ohio. C. V. Shepard, *Dist. Foreman;* G. A. Scrafford, *Foreman of Gagers,* Newark, Ohio. 1,600 miles, 6 to 12-in. trunk lines; 5,200 miles of laterals.

C

California Co., The, 225 Bush St., San Francisco, Calif. (Pipe Line Division).

H. D. Collier, *Chm. Bd.* V. G. Lund, *Pres.* H. F. Davies, J. H. Payne, B. W. Letcher, *V. P.s.* H. C. Teasdel, *Sec.* and *Treas.* 67 miles, 10-in.

California Pipe Line Co., 1818 Canal Bldg., New Orleans, La.

Gage Lund, *Pres.* H. F. Davies, J. H. Payne, *V. P.s.* H. C. Teasdel, *Sec.* and *Treas.* R. D. Copley, 1004 U. S. National Bank, Denver, Colo., *Dist. Supt.* 20 miles, 4-in.

Canadian Oil Companies, Ltd., Terminal Bldg., Toronto, Ont.

John Irwin, 385 Bridge St., Montreal, *Pres.* Frank C. West, *V. P.* and *Mgr. Dir.* P. A. Thompson, Montreal; Gordon F. Perry, *V. P.s.* H. F. Hoecker, *Sec.* C. W. Walker, *Treas.* Earl A. Smith, *Supt.;* V. M. Norwood, *Ch. Engr.;* A. E. Tobias, *Gen. Foreman;* Chris. Ayscough, *Ch. Electrician;* Garnet Kirby, *Refrig. Engr.;* John M. Allan, *Research Dir.;* F. W. Scarsbrook, *Chem.;* Percy Parker, *Cracking Oper.;* A. Tomlinson, *Office Mgr.,* Box 600, Petrolia, Ont. James Warwick, Froomfield, Ont., *Foreman P. L. Dept.* 48 miles, 2 to 4-in.

Canyon Pipe Line Co., 115½ N. Locust St., Centralia, Ill.

Paul L. Hale, *Trustee.* Loyed A. Sheppard, *Field Supt.* 30 miles, 4-in.

Cardinal Oil Co., San Angelo, Tex.

George D. Morgan, *Pres.* C. E. Aikman, *V. P.* W. C. Nye, *Engr.* F. R. Barnett, Iraan, Tex., *Supt.* 13 miles, 2-in.

Cimarron Valley Pipe Line Co., Box 1078, Enid, Okla.

H. H. Champlin, *Pres.* Joe N. Champlin, *V. P.* E. G. Wilmoth, *Sec.* and *Treas.* Granvle Wilkinson, *Asst. Sec.* and *Treas.* E. G. Wilmoth, Enid, Okla., *Gen. Mgr.* B. Payne, Billings, Okla., *Gen. Field Supt.* H. B. Johns, Marland, Okla.; Ray Brown, Oklahoma City, *Dist. Supts.* C. Stover, *Ch. Gager* M. R. McMahan, *Asst. Gen. Field Supt.* J. T. Young, Oklahoma City, *Foreman.* Roy Collier, Enid, *Civil Engr.* B. F. Parkhurst, Billings, *Foreman.* 282 miles, 4 to 8-in.

Col-Tex Refining Co., 1000 Ramsey Tower, Oklahoma City, Okla.

L. H. Prichard, *Pres.* J. Steve Anderson, *V. P.* P. H. Anderson, *Sec.* and *Treas.* George H. Burruss, *Gen. Mgr. Ref.* Neal Prichard. *Ref. Supt.* William Brookover, *P. L. Supt.,* Colorado City, Tex. 74 miles, 3 and 4-in.

Comanche Pipe Line Corp., Box 73, Midland, Tex.

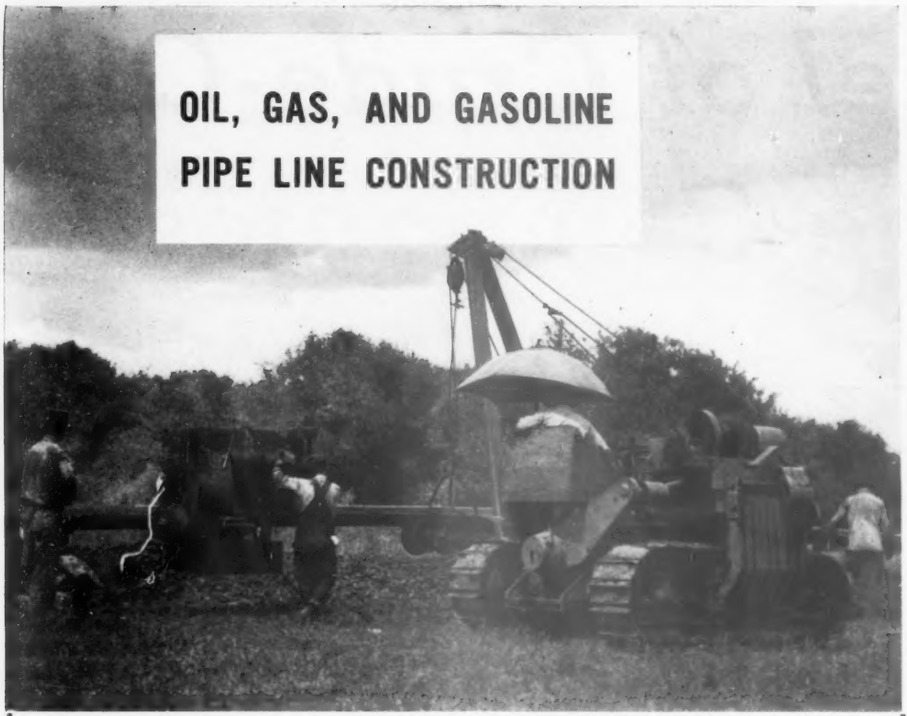
J. C. Ratliff, Jr., *Pres.* and *Gen. Mgr.* T. B. Harris, Jr., Box 1275, Monahans, Tex., *V. P.* and *Supt.* William H. Waldrop, *Sec.* and *Treas.* 50 miles, 2 and 4-in.

Continental Pipe Line Co., Ponca City, Okla.

Dan Moran, *Pres.* J. G. Dyer, *V. P.* and *Mgr.* W. H. Ferguson, G. F. Smith, *V. P.s.* A. C. Frazer, *Sec.* G. F. Smith, *Treas.* M. H. Shanahan, *Asst. Mgr.* W. L. Kygar, *Asst. to Mgr.* A. C. Wilkinson, *Gen. Supt.* T. R. Batte, Houston, Tex.; E. F. Huffman, Ponca City, Okla.; E. O. Sturm, Wichita Falls, Tex.; Neil Stallard, Texon, Tex., *Dist. Supts.* 1,815 miles, 2 to 10-in.

Cosden Pipe Line Co., Box 1311, Big Spring, Tex.

R. L. Tollett, *Pres.* A. V. Karcher, *Sec.* R. W. Thompson, *Supt.* M. M. Hines, Forsan, Tex., *Ch. Gager.* 26 miles, 4 and 8-in.



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Crude Oil Pipe Line Co., Arkansas City, Kans.
C. M. Boggs, *Pres.* R. R. Cox, *V. P.* and *Treas.* E. K. Childers, *Sec.* C. O. Dorrance, *Supt.* J. S. Boggs, *Asst. Supt.* C. B. Alford, *Const. Supt.* 200 miles, 4-in.

Cushing Refining & Gasoline Co., Cushing, Okla.
R. C. Jones, *Pres.* Rex H. Winget, *V. P.* Max E. James, *Sec.* and *Treas.* J. H. Hutchinson, *Gen. Supt.* F. A. Davis, *Supt.* 228 miles, 2 to 8-in.

D

Deep Rock Oil Corp., Atlas Life Bldg., Tulsa, Okla.
H. N. Greis, *Pres.* W. R. Francisco, B. L. Majewski, W. E. Moody, R. K. Huey, *V. P.s.* O. O. Kerr, *Sec.* and *Treas.* A. L. Dade, *Mgr. P. L. Dept.* J. H. Tubbs, *Asst. Mgr.* Isaac Biddle, Bristow; M. L. Eckley, Drumright; G. D. Biddle, Seminole, *Dist. Supts.* 520 miles.

Derby Oil Co., The, 352 N. Broadway, Wichita, Kans.
Carl Fisher, *Pres.* H. E. Zoller, *Exec. V. P.* S. P. Wallingford, F. W. McCurry, *V. P.s.* E. Wasser, *Sec.* E. C. Claiborne, *Treas.* John Schell, *Supt.* Ed Woods, *Asst. Supt.* E. L. Edwards, Hutchinson, Kans., *Asst. Supt.* 235 miles, 2 to 5-in.

Duval Pipe Line Co., 223 Fourth Ave., Pittsburgh, Pa.
O. D. Robinson, *Pres.* D. W. Hovey and David D. Johnson, *V. P.s.* William H. Moreland, *Sec.* and *Treas.* E. L. Sauer, Houston, Tex., *Asst. Treas.* George E. Casey, *Supt.* Donald MacMillan, Corpus Christi, Tex., *Office Mgr.* 44 miles, 2 to 6-in.

E

East Texas Refining Co., Tower Petroleum Bldg., Dallas, Tex.
W. G. Skelly, *Pres.* C. C. Herndon, *V. P.*, Tulsa. L. F. Brothers, *V. P.* F. T. Hopp, *Sec.* and *Treas.* John R. Scott, *Asst. Sec.* and *Treas.* John J. Thomas, *Supt.*; J. R. Mickle, *Asst. Supt.*, Longview, Tex. M. A. Ackley, Stamps, Ark., *Asst. Supt.* 90 miles, 2 to 6-in.

El Dorado Refining Co., The, El Dorado, Kans.
Chas. G. Yankey, *Pres.* T. A. Helling, *V. P.* Robt. H. Bradford, *V. P.* and *Treas.* George J. Peterschmidt, *Sec.* Grover C. Anderson, *Supt.* H. J. Datin, *Asst. Supt.* 25 miles, 2 and 3-in.

Empire Pipe Line Co., Bartlesville, Okla.
H. R. Straight, *Pres.* A. W. Ambrose, *V. P.* C. E. Murray, *V. P.* and *Sec.* Lloyd Lynd, *Treas.* A. N. Horne, *Mgr.* W. A. Fisher, *Asst. Mgr.* Wm. Bayman, *Master Mech.*; M. T. Fairchild, *Asst. Dist Supt.*, Ponca City, Okla. A. E. Steward, *Ch. Gager;* Joe Ham, *Dist. Supt.*, Box 1163, Oklahoma City. Thomas Cole, Box 366, Madison, Kans.; C. A. Mason, Box 12, Oil Hill, Kans.; T. J. Lanagan, Box 711, Cushing, Okla.; P. O. Teter, Box 718, Gladewater, Tex., *Dist. Supts.* 822 miles, 2 to 12-in

Eureka Pipe Line Co., 210 Seneca St., Oil City, Pa.
Allan T. Towl, *Pres.* J. M. Tussey, *V. P.* and *Treas.* E. W. Ziegler, *Sec.* E. W. Macklin, *V. P.* and *Gen. Mgr.* M. J. Leonard, *Gen. Supt.* Roy Godfrey, *Div. Supt.* W. L. Fuller, Parkersburg, W. Va., *Ch. Engr* W. F. Alexander, Mannington, W. Va., *Div. Supt.* 4,304 miles, 2 to 10-in.

F

Frontenac Pipe Line Co., Peoples National Bank Bldg., Tyler, Tex.
James A. Wales, *Pres.* John Warren, *V. P.* H. B. Morris, *Sec.* Lucille Mardock, *Treas.* D. W. Johnson, Kilgore, Tex., *Supt.* 50 miles.

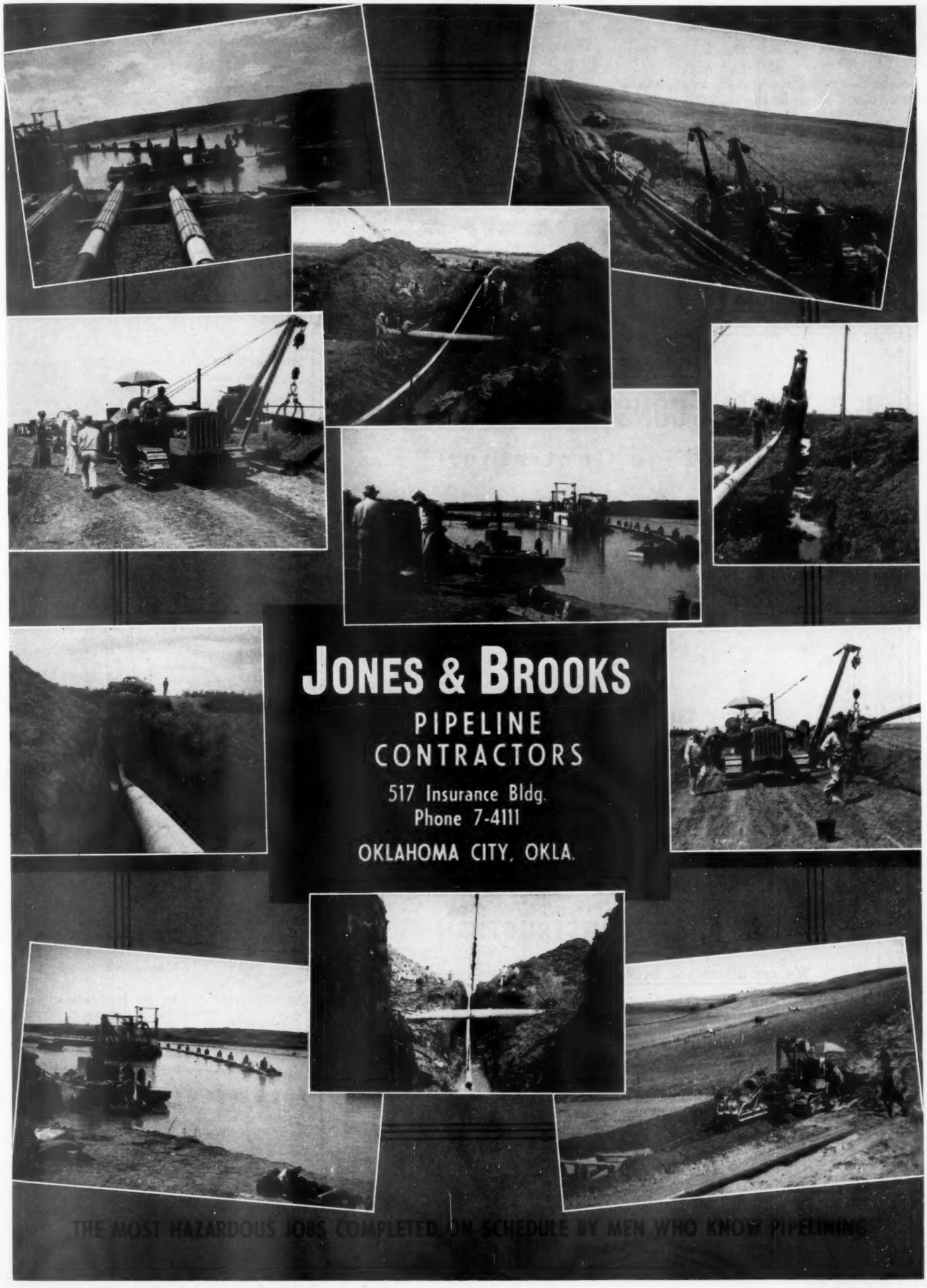
Frontier Oil Co., 615 Insurance Bldg., San Antonio, Tex.
Alexander Boynton, *Pres.* Anna Boynton, *V. P.* Sida S. Martin, *Sec.* and *Treas.* A. B. Higgenbottom, Somerset, Tex., *Prod. Supt.* 12 miles, 3-in.

G

General Petroleum Corp. of California, 108 W. Second St., Los Angeles, Calif.
S. J. Dickey, *Pres.* R. A. Sperry, A. H. DeFriest, E. L. Adams, B. E. Parsons, *V. P.s.* D. W. Woods, *Sec.* W. Cunningham, *Treas.* J. L. Martin, *Gen. Supt.* G. H. Supple, *Asst. Mgr.* R. F. Kline, *Asst. Gen. Supt.* W. J. MacArthur, *Master Mech.* L. Andrews, V. C. Larsen, Taft, *Div. Supts.* J. T. Carpenter, *Ch. Electrician.* R. W. Wardell, *Tech. Engr.* 806 miles, 2 to 12-in.

Glacier Production Co., 40 E. Broadway, Butte, Mont.
F. W. Bird, *Pres.* M. E. Buck, *V. P.* S. P. Hogan, *Sec.* J. R. Thomas, *Treas.* R. D. Smith, *Asst. Gen. Mgr.* J. E. Hopp, *Field Mgr.;* R. E. Lee, *Supt. Oil Field;* M. A. Hardie, *Supt. Gas Field,* Cut Bank. 35 miles, 2 to 8-in.

Gladewater Pipe Line Co., Gladewater, Tex.
C. R. Starnes, *Pres.* E. L. Ames, *Sec.* and *Treas.* 10 miles, 4-in.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I. A. O'Shaughnessy, *Pres.* F. L. Jehle, J. F. O'Shaughnessy, *V. P.s.* L. W. Dyer, *Sec.* and *Treas.* F. A. Smalley, Box 128, St. Elmo, Ill., *Supt.* 7 miles, 6 and 8-in.

Golden Bear Oil Co., 325 W. Eighth St., Los Angeles, Calif.
J. M. Feldman, *Pres.* Charles P. Prewett, Box 378, Bakersville, Calif., *V. P.* and *Supt.* Louis L. Swarthe, *Sec.* and *Treas.* M. B. Pardew, Bakersfield, *Ref. Supt.* 15 miles, 6-in.

Grayburg Pipe Line Co., 1419 Smith-Young Tower, San Antonio, Tex.
R. D. Brown, *Pres.* Claude V. Birkhead and R. D. Brown, Jr., *V. P.s.* Arthur D. Kohler, *Sec.* and *Treas.* H. T. McDow, Luling, Tex., *Supt.* 21 miles, 2 and 4-in.

Gulf Oil Corp., Gulf Bldg., Pittsburgh, Pa.
F. A. Leovy, *Chm. Bd.* J. F. Drake, *Pres.* H. L. Stone, *Exec. V. P.* and *Gen. Counsel.* E. C. Bothwell, W. A. Slater, H. A. Gidney, Rush Greenslade (Tulsa), W. V. Hartmann, E. C. Kincade (Houston), C. R. Minor (Shreveport), B. P. Newton, W. B. Pyron (Houston), *V. P.s.* David Proctor, *Sec.* J. E. Nelson, *V. P.* and *Treas.*

Houston Pipe Line Division, Box 2100, Houston, Tex.
N. H. Perry, *Gen. Supt.* J. L. Irvin, *Asst. Gen. Supt.* C. M. Rosebrugh, *Ch. Engr.* L. L. Shannon, *Ch. Dispatcher.* W. H. Cederlof, *Asst. Dispatcher.* C. C. Perry, *Asst. Ch. Gager.* C. C. Sampson, *Supt. Tel. & Tel.* L. A. Brauer, F. C. Vancleave, W. F. Rollins, *Div. Supts.* G. W. Tohline, Fort Worth; F. L. Benthall, Houston; L. L. Kincade, Shreveport; E. Jones, *Master Mechs.* G. W. Harrington, Shreveport; W. B. Adams, Sour Lake, Tex.; J. A. Brown, Mooringsport, La.; J. A. Carnahan, Dubberly, La.; R. C. Sanders, Roscoe, Tex.; Guy Crisman, Overton, Tex.; C. E. Hanratty, Goose Creek, Tex.; F. K. Irwin, Vinton, La.; B. H. Jenkins, Houston; C. G. Johnson, Beaumont; E. F. McEntyre, Fort Worth; W. H. Parr, Borger; J. W. Pyron, Odessa, Tex.; W. N. McGyer, Buras, La., *Dist. Foremen.* W. B. Melton, Houston, *Line Foreman.* R. M. Pyron, *Foreman Machine Shop;* Clyde Hayes, *Asst. Foreman,* Beaumont. C. G. Brandt, Port Arthur; J. E. Clifton, Saltillo, Tex.; W. T. Denard, Lufkin, Tex.; E. R. Martin, Chester, Tex.; H. A. Vancleave, Wortham, Tex.; Rex Ward, Henderson, Tex., *Pump Sta. Foremen.* W. M. Boyd, Sour Lake, Tex.; W. H. Deprang, Jefferson, Tex.; J. S. Fowler, Timpson, Tex.; T. E. Harris, Grandview, Tex.; J. W. Holt, Jr., Beaumont; J. F. Nixon, Odessa, Tex.; L. G. Pittman, Hobby, Tex.; J. R. Ross, Weatherford, Tex.; G. W. Thompson, Roscoe, Tex.; T. L. Thompson, Ranger, Tex.; R. Walker, Coahoma, Tex.; L. R. Woodall, Clyde, Tex., *Running Ch. Engrs.* 3,869 miles trunk lines.

Gulf Refining Co. (Tulsa Pipe Line Division), Box 661, Tulsa, Okla.
J. R. Murphy, *Gen. Supt.* P. L. Reichard, *Asst. Gen. Supt.* Arthur Ray, *Div. Supt.* H. L. Rearick, *Asst. Div. Supt.* H. G. Bard, *Ch. Dispatcher.* R. E. Trumbull, *Master Mech.* Harry Jones, *Supt. Tel. & Tel.* F. E. Hart, Indianapolis, Ind., *Div. Scout.* Tom Ryan, *Supt. Tank Const.* J. J. Vaughn, *Sta. Foreman.* E. M. Dalton, Drumright, Okla.; J. B. Heard, Hobbs, N. M.; Arch Miller, Frederick, Okla.; C. H. Estes, Seminole, Okla., *Dist. Foremen.* E. E. Swanson, Cambridge City, Ind.; T. C. Carlisle, Pawnee, Okla.; P. R. Swinney, Henryetta, Okla.; Gus Mager, McAlester, Okla., *Pump. Sta. Foremen.* K. S. Slagle, Pryor, Okla.; W. M. Prather, Anderson, Mo.; W. A. Hopson, Monett, Mo.; H. D. Key, Springfield, Mo.; H. B. McCullough, Nebo, Mo.; C. B. Flippo, Steelville, Mo.; C. H. Morrison, Valmeyer, Ill.; Oliver Forbes, Breese, Ill.; G. H. Crawford, Edgewood, Ill.; W. L. Berry, Hutsonville, Ill.; R. H. Gray, Poland, Ind.; J. C. Brown, Greenwood, Ind., *Running Ch. Engrs.* 1,933 miles.

H

Hancock Oil Co. of California, The, 2828 Junipero Ave., Long Beach, Calif.
Will J. Reid, *Pres.* G. P. Deane, *Exec. V. P.* E. E. Pyles, *V. P. Chg. Prod.* John W. Hancock, *Sec.* W. T. Hancock, *Treas.* Lloyd C. DeHarte, *P. L. Supt.* G. B. Rusk, *Prod. Supt.* H. M. Oliver, *Geol.* John D. Murray, *Gas* and *Oil Meter Engr.* E. W. Bills, *Asst. Prod. Supt.* James W. Edwards, *Blending* and *Shipping Foreman.* Joseph L. Murray, *Maint. Foreman.* F. L. Smith, *Ch. Chem.* Arthur E. Williamson, *Oper. Foreman.* H. T. Boehme, *Engr.* and *Constr. Foreman.* Walter Bell, Rt. 5, Box 257, Bakersfield, Calif., *Prod. Foreman.* 49 miles, 8-in.

Humble Pipe Line Co., Drawer 2220, Houston, Tex.
R. V. Hanrahan, *Pres.* J. A. Neath, *V. P.* and *Gen. Supt.* J. M. Monaghan, *Sec.* and *Asst. Treas.* C. D. Voss, *Treas.* N. V. Truly, *Comptroller.* S. G. Loy, *Asst. Comptroller.* O. Q. Lomax, *Asst. Gen. Supt.* C. C. Moore, *Asst. Sec.* H. M. Stevenson, *Ch. Engr.* Gus Kellogg, *Supt. Claim & Rt. of Way.* H. M. Lingle, *Pur. Agt.* R. M. Bayless, *Supt. Tel. & Tel.* T. R. Hanrahan, *Div. Supt.* J. W. Thomas, Midland; W. L. Howard, Corpus Christi; F. D. McMahon, Longview; J. C. Hanrahan, Cisco, *Div. Supts.* 7,764 miles, 3 to 12-in.

I

Illinois Pipe Line Co., The, 539 S. Main St., Findlay, Ohio
Charles Bunje, Jr., *Pres.* P. W. Hennessy, *V. P.* O. F. Moore, *V. P.* and *Sec.* C. H. Gompf, *Treas.* A. B. Johnson, *Ch. Engr.* F. H. Warren, *Asst. Ch. Engr.* S. S. Richards, *Pur. Agt.* R. M. Slough, *Supt. Communications.* E. C. Welch, Geo. Pulley, R. J. Fitzgerald, *Supts.*, Bridgeport, Ill.; R. N. Montgomery, Houston, Tex.; R. M. Sackett, Casper, Wyo., *Gen. Supts.* O. M. Jaco, Martinsville, Ill.; P. E. Thompson, Lima, Ohio; E. H. Perry, Arp, Tex.; J. W. Lawler, McFadden, Wyo.; J. W. Cumming, Shelby, Mont.; H. C. Warters, Robinson, Ill., *Supts.* H. B. Blackburn, Iraan, Tex., *Acting Supt.* 4,745 miles.

Imperial Pipe Line Co., Ltd., The, Sarnia, Ontario, Canada
G. H. Smith, *Pres.* W. J. Whitling, *Sec.* and *Treas.* J. R. Simpson, 56 Church St., Toronto, Ontario, Canada, *V. P.* and *Gen. Mgr.* 9 miles, 6 and 8-in.

Indiana Pipe Line Co., Huntington, Ind.
H. A. Somers, Jr., *Gen. Mgr.* G. L. Robinson, *Supt.* C. D. Hall, *Asst. Sec.* F. A. McClelland, *Oil Dispatcher.* 148 miles.

International Pipe Line Co., Box 2332, Houston, Tex.
M. Halpern, *Pres.* R. L. Saunders, *Sec.* L. H. Lindeman, *Treas.*, 135 E. 42nd St., New York City. H. S. McCray, Sunburst, Mont., *Supt.* 28 miles trunk lines, 54 miles gathering lines.

K

Kaw Pipe Line Co., Houston, Tex.
B. E. Hull, *Pres.* J. K. McGoldrick, *V. P.* and *Gen. Mgr.* E. F. Guidinger, A. N. Horne, *V. P.s.* H. L. Steward, *Sec.* and *Treas.* 586 miles.

Kendall Refining Co., Bradford, Pa.
Otto Koch, *Pres.* and *Treas.* J. B. Fisher, *Exec. V. P.* Jos. H. Bovaird, *V. P.* J. B. Fisher, *Sec.* W. M. Magee, *P. L. Supt.* 100 miles, 2 to 5-in.

Keystone Pipe Line Co., 260 S. Broad St., Philadelphia, Pa.
Robert C. Tuttle, *Pres.* and *Gen. Mgr.* R. H. Colley, H. G. Schad, *V. P.s.* B. G. McKain, *Sec.* Paul Shuman, *Treas.* J. M. Williams, *Dept. Head* and *Supt.*

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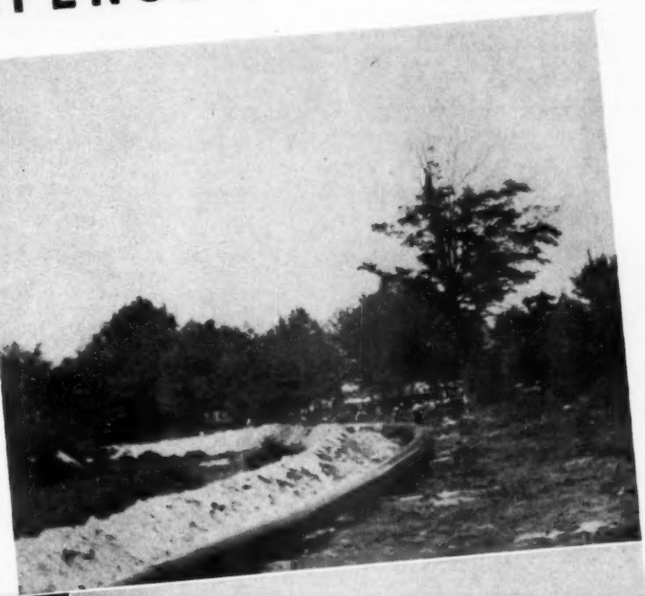

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I.

Lawrence Pipe Line Co., Box 2332, Houston, Tex.

B. E. Hull, *Pres.* and *Mgr.* A. S. Bailey, R. B. McLaughlin, *V. P.s* and *Asst. Mgrs.* G. W. Fox, *Sec.* J. W. Emison, *Treas.* 57 miles.

Leonard Pipe Line Co., Box 323, Mount Pleasant, Mich.

J. W. Leonard, *Pres.* David Beach, *V. P.* and *Gen. Mgr.* G. L. Cook, *Sec.* B. M. Jones, *Treas.* Robert Bloomer, *Supt.* Frank Baker, Clare. Mich., *Gen. Foreman.* 85 miles, 3 to 6-in.

Lion Oil Refining Co., El Dorado, Ark.

Col. T. H. Barton, *Pres.* T. M. Martin, *V. P.* and *Gen. Mgr.* J. E. Howell, *V. P. Chg. Prod. Dept.-P. L.* Jeff Davis, *Sec.* R. E. Meinert, *Treas.* E. W. Hardage, *Gen. Supt.* J. B. Tims, *Supt.* V. M. Speer, *Const. Foreman.* 160 miles, 2 to 8-in.

Loudon Pipeline Co., Box 57, Pana, Ill.

Sam D. Jarvis, *Pres.* C. Hayden Davis, *V. P.* R. A. Hose, *Treas.* L. C. Kesler, *Supt.* H. C. Goettig, *Auditor.* 30 miles, 3 and 6-in.

Mc

McSpadden Co., Houston, Tex.

C. C. McSpadden, *Pres.* C. R. McSpadden, *V. P.* and *Sec.* C. H. McSpadden, *V. P.* and *Treas.* A. O. Beavers, Port Lavaca, Tex., *Supt.* 2 miles, 2-in.

M

Magnolia Pipe Line Co., Box 900, Dallas, Tex.

D. A. Little, *Pres.* L. S. Sinclair, J. L. Latimer, Wallace Hawkins, M. J. McLaughlin, George Miller, John W. Newton, *V. P.s.* G. L. Tate, *Sec.* W. L. Holmes, *Treas.* L. H. True, *Asst. Mgr.* A. R. Ehrhardt, *Supt. Maint.* J. G. Norton, *Ch. Mech. Engr.* F. P. Childress, *Ch. Dispatcher.* E. A. Koenig, *Corrosion Engr.* Don R. Gladney, *Supt. Right-of-Way.* George T. Jackson, *Supt. Welders.* O. D. Stallard, Jr., *Div. Supt.* C. E. Still, *Dist. Supt.* A. J. Balcom, *Gen. Supt. Tel. & Tel.* J. W. Hale, *Asst. Gen. Supt.* H. H. Watson, *Supt. Tel. & Tel.* D. H. Levy, *Elec. Engr.* L. E. Adler, *Engr.* A. W. Frey, Box 618, Corsicana, Tex., *Asst. Supt. Maint.* A. T. Glover, *Div. Supt.;* V. L. Red, *Dist. Supt.;* E. M. Phillips, *Ch. Gager;* E. A. Volts, *Gen. Foreman, Tel. & Tel.*, Oklahoma City. F. D. Breedlove, *Dist. Supt.;* C. R. Fitch, *Dist Foreman*, Midland, Tex. L. A. Hancock, *Dist. Supt.* A. W. Butler, *Ch. Gager*, Longview, Tex. O. M. Joy, Wewoka, Okla.; H. M. Van Buskirk, Healdton, Okla.; H. F. Smith, Wichita Falls, Tex.; O. H. Beshell, Olden, Tex., *Dist. Supts.* C. C. Coffindoffer, Shreveport, La., *Asst. Dist. Supt.* N. J. Jacobi, Electra, Tex., *Ch. Gager.* J. E. McGeath, *Div. Supt.;* J. H. Joy, *Dist. Supt.*, Houston, Tex. D. R. Ford, Beaumont, Tex., *Asst. Supt.* H. C. Alton, *Dist. Supt.;* M. E. Powell, *Ch. Gager, Alice, Tex.* Roland McDonald, Vanderbilt, Tex., *Dist. Foreman.* R. W. Stewart, Luling, Tex., *Dist. Supt.* 3,929 miles, 4 to 12-in.

M-A-R Pipe Line Co., Box 1500, Corpus Christi, Tex.

D. D. Rogers, *Pres.* T. E. McArdle, *V. P.* and *Gen. Mgr.* C. Andrade III, *V. P.* C. M. Hall, *Sec.* and *Treas.* H. E. Tyson, *Supt.* 84 miles, 2 to 6-in.

Mid-Continent Pipe Line Co., Mid-Continent Bldg., Tulsa, Okla.

Jacob France, *Pres.* J. C. Denton, *V. P.* and *Ch. Counsel.* G. O. Moody, *V. P.* E. M. Rouzer, *Sec.* Charles Klein, *Treas.* J. A. Beyhan, *Gen. Supt.* J. M. Linehan, *Supt.* F. E. Pyeatt, Jr., *Ch. Engr.* H. D. Bennett, Supt. *Tel.* and *Tel.*, J. T. Meador, *Ch. Oil Dispatcher.* W. H. Bates, *Master Mech.* H. H. Thompson, *Dist. Foreman.* W. A. Smith, Box 272, Druright, Okla.; J. P. Ellis, Rte. 1, Weleetka, Okla.; W. C. Wren, Box 578, Hominy, Okla., *Dist. Foremen.* 1,204 miles, 2 to 10-in.

Moutray Oil Co., Abilene, Tex.

E. W. Moutray, *Pres.* L. P. Kirk, *V. P.* Mrs. Vera Middleton, *Sec.* Mrs. M. P. Moutray, *Treas.* E. W. Moutray, *Mgr.* O. L. Snyder, *Supt.* Lee Walker, Hawley, Tex., *Sta. Engr.* 1½ miles, 3-in.

Murchison & Closuit, Inc., 1904 Alamo National Bldg., San Antonio, Tex.

T. F. Murchison, *Pres.* E. M. Closuit, *V. P.* Nelson P. Wimberly, *Sec.* and *Treas.* Oren C. Roberts, Artesia, N. M., *Supt.* 50 miles, 4½-in.

N

National Refining Co., The, Hanna Bldg., Cleveland, Ohio

K. R. Proctor, *V. P.* Louis S. Pierce, *V. P.* and *Sec.* R. E. Channock, *Asst. Treas.* G. M. Taylor, *Mgr. P. L.* William Jack, Bartlesville, Okla., *Supt.* J. E. Tighe, El Dorado, Kans., *Asst. Supt.* 859 miles, 2 to 8-in.

National Transit Co., 206 Seneca St., Oil City, Pa.

D. M. Sachs, *Pres.* J. H. Contino, *V. P.* and *Treas.* F. G. Zimmerman, *Sec.* E. H. Fortmann, *Gen. Mgr.* S. D. Osborne, *Dispatcher.* M. W. Robinson, *Engr.* J. A. Carlson, C. R. Tompsett, *Foremen.* C. L. Guignon, Warren, Pa., *Supt.* George Shira, Butler, Pa., *Foreman.* N. A. Emig, Akron, Ohio, *Acting Supt.* 3,450 miles, 2 to 12-in.

New Mexico Pipe Line Co., Ponca City, Okla.

W. H. Ferguson, *Pres.* W. W. Bruce, Martin Yates, Jr., *V. P.s.* G. F. Smith, *Sec.* and *Treas.* J. G. Dyer, *Mgr.* A. C. Wilkinson, *Gen. Supt.* Neil Stallard, Texon, Tex., *Dist. Supt.* 70 miles, 2 to 6-in.

New York Transit Co., Olean (Cattaraugas County), N. Y.

M. H. Lamb, *Dist. Foreman.* 70 miles.

Northern Group Pipe Lines (comprising Indiana Pipe Line Co., The Buckeye Pipe Line Co., Northern Pipe Line Co. and New York Transit Co.), offices at 26 Broadway, New York, N. Y.

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Northern Pipe Line Co., 206 Seneca St., Oil City, Pa.

J. A. Bartlett, *V. P.* and *Gen. Mgr.* J. P. Blackford, *Asst. Sec.*

Norwalk Co., The, 437 S. Hill St., Los Angeles, Calif.

L. L. Aubert, *Pres.* and *Gen. Mgr.* J. L. Barneson, C. G. Bullis, *V. P.s.* W. E. Cropp, *Sec.* and *Treas.* K. E. Grigsby, *Supt.;* K. Ritchie, *Engr.*, Maricopa. Calif. 20 miles, 4 to 6-in.

Nueces Pipe Line Co., Heep Bldg., Corpus Christi, Tex.

J. L. Sullivan, *Pres.;* G. E. Sullivan, *V. P.;* B. K. S. Garnett, *Sec.-Treas.;* I. J. Alexander, *Supt.* 15 miles, 3 and 4½-in.

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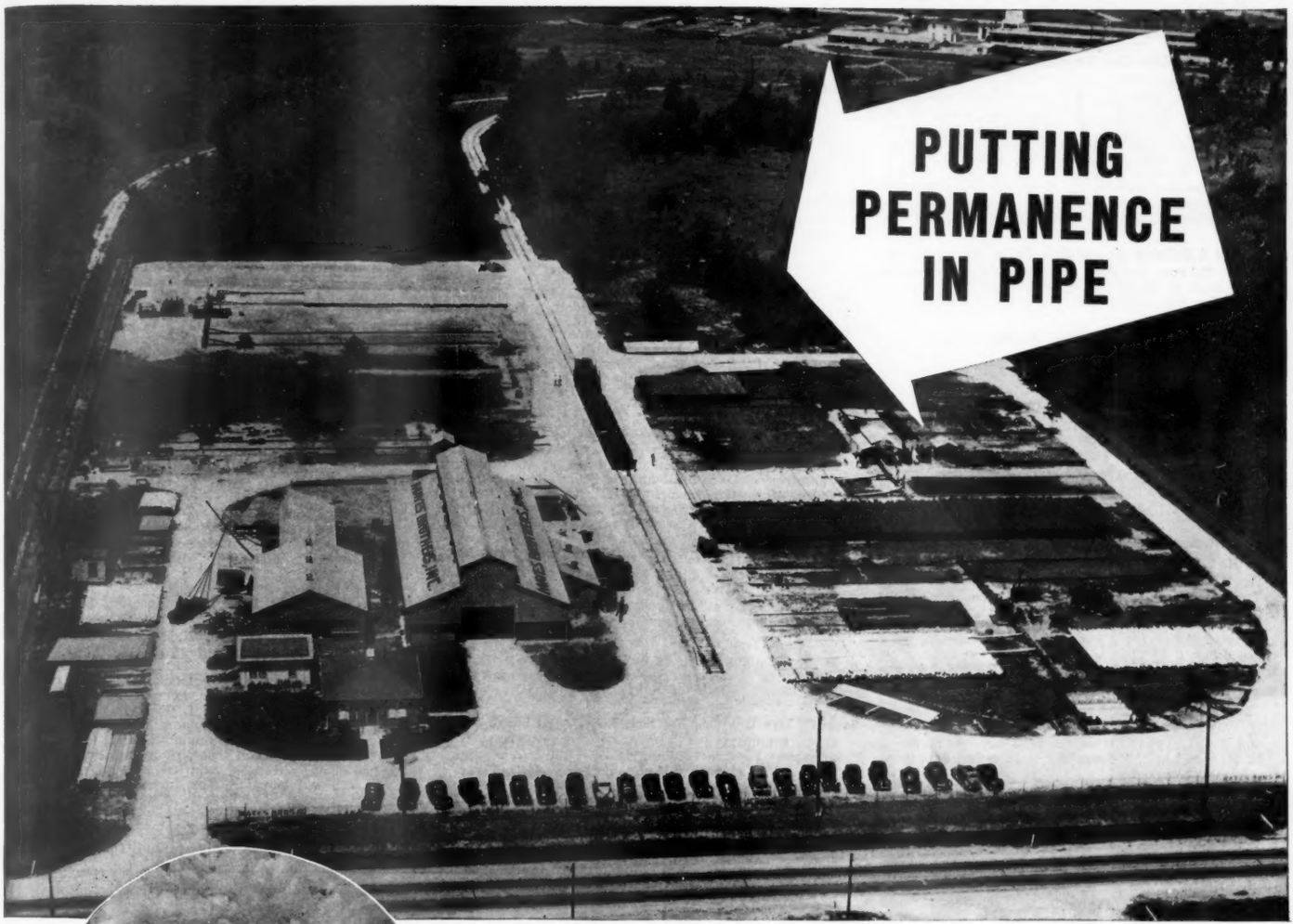

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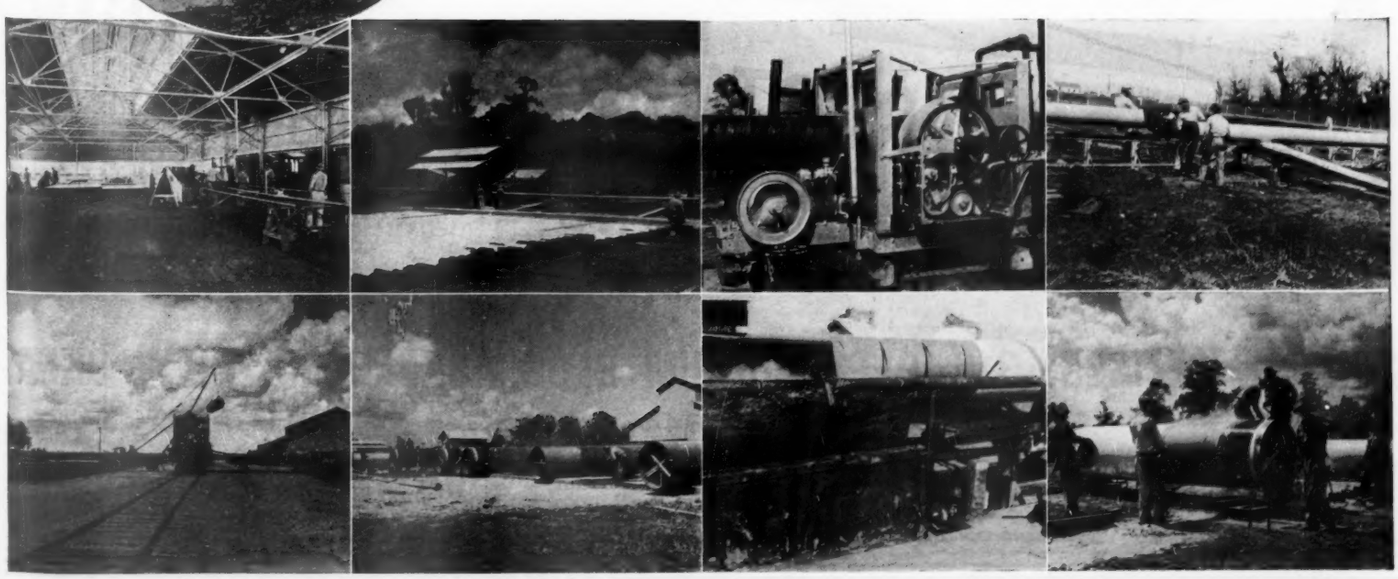

O

Oklahoma Pipe Line Co., National Bank of Tulsa Bldg., Tulsa, Okla.
Paul Griffin, *Pres.* and *Treas.* H. P. Hellinghausen, *Sec.* Bruce Ramsey, *V. P.* and *Gen. Supt.* O. C. Nonweiler, *Ch. Engr.* A. E. Erickson, *Dist. Supt.* H. S. Foote, *Ch. Dispatcher.* George B. Randels, *Dist. Supt.;* John D. Bowers, St. Elmo, Ill.; G. C. Pollard, Wewoka, Okla.; C. A. Goodin, Wilson, Okla., *Const. Foremen.* R. F. Ball, *Pur. Agt.* Fred Armstrong, *Electrical Foreman;* E. E. Fuller, Wewoka, Okla., *Mech. Foreman.* 1,380 miles, 2 to 10-in.

Olney Oil & Refining Co., Wichita Falls, Tex.
C. W. Cahoon, Jr., *Pres.* and *Treas.* C. M. Crowell, *Sec.* Jack P. Slater, *Supt.;* Phil Slater, *P. L. Foreman,* Box 848, Olney, Tex. 10 miles, 2 and 4-in.

Onyx Refining Corp., Box 330, Abilene, Tex.
O. B. Stephens, *Pres.* and *Treas.* F. H. Murphy, *V. P.* and *Sec.* I. H. Lantz, *Supt.* 9 miles, 2-in.

Osage Trust, Osage, Wyo., and Chadron, Neb.
Edwin D. Crites, Box 1276, Chadron, Neb., *Sole Trustee;* H. E. Reische, *Sec.;* C. F. Coffee, Jr., *Treas.;* E. B. Jones, Osage, Wyo., *Gen. Mgr.;* H. T. Thorson, Osage, Wyo., *Gen. Supt.* 3½ miles, 4-in.

P

Pan American Pipe Line Co., 122 E. 42nd St., New York, N. Y.
Dr. Robert E. Wilson, *Pres.* E. G. McKeever; E. R. Turner, Houston, *V. P.s.* L. M. Wilson, *Sec.* J. A. Carroll, Jr., *Treas.* F. E. Richardson, *Mgr.;* A. J. Rabe, *Gen. Supt.;* S. M. Stanley, *Pur. Agt.;* W. M. Padgett, *Office Mgr.,* Esperson Bldg., Houston, Tex. 740 miles, 2 to 12-in.

Panola Pipe Line Corp., 1608 Santa Fe Bldg., Dallas, Tex.
H. L. Hunt, *Pres.* J. S. Loftin, *V. P.* Roy Lee, *Sec.* and *Treas.* Fred Taylor, Box S, Arp, Tex., *Supt.* E. H. Gunter, *Div. Order Dept.* 18 miles, 2 to 4-in.

Pasotex Pipe Line Co., Womble Blvd., El Paso, Tex.
H. D. Collier, *Chm. Bd.;* A. J. Cunningham, *Pres.* E. H. Todd, *V. P.* R. G. McIntyre, *Sec.* and *Treas.* W. H. Burgess, *Dir.* A. W. Gleason, *Supt.* 216 miles, 3 to 8in.

Pettus Oil & Refining Co., Pettus, Tex.
Morris Roberts, *Pres.* W. D. Walton, *V. P.* George A. Ray, Jr., *Sec.* and *Treas.*

Pioneer Oil & Refining Co., 604 Carolina St., San Antonio, Tex.
A. B. Slimp, *Pres.* C. A. Slimp, *V. P.* S. B. Sloan, *Sec.* F. A. Slimp, *Treas.* J. E. Dismukes, *Supt.;* A. I. Robertson, *Asst. Supt.,* Somerset, Tex. 28 miles, 3 and 4-in.

Premier Oil Refining Co. of Texas, Longview, Tex.
Sylvester Dayson, *Pres.* Sam W. Ross, *V. P.* R. P. Hargis, *Sec.* and *Treas.* W. T. Reed, *Supt.* J. G. Sullivan, Kilgore; F. C. Peters, Cotton Valley, La., *Ch. Gagers.* 39 miles, 2 to 6-in.

Pure Oil Pipe Line Co. (Pennsylvania), 35 E. Wacker Drive, Chicago, Ill.
D. D. Irwin, *Pres.* Henry Hauseman, *V. P.* C. H. Jay, *Sec.* and *Treas.* J. H. Botkin, *Comptroller.* D. E. Sullivan, *Ch. Engr.* E. A. McCadden, Marcus Hook, Pa., *Supt.* 67 miles, 6 and 8-in.

Pure Transportation Co., 35 E. Wacker Drive, Chicago, Ill.
D. D. Irwin, *Pres.* Henry Hauseman, G. C. Morris, *V. P.s.* C. H. Jay, *Sec.* and *Treas.* J. H. Botkin, *Comptroller.* D. E. Sullivan, *Ch. Engr.* R. E. Young, Tulsa, *Mgr. Oklahoma Lines.* G. C. Morris, Beaumont, Tex., *Mgr. Texas* and *Louisiana Lines.* R. H. Parr, Van, Tex.; H. C. Christman, Lake Charles, La.; J. F. Miller, Mount Pleasant, Mich.; C. L. Bernard, Tulsa, Okla., *Supts.* 487 miles, 5 to 10-in., 296 miles of gathering lines.

R

Reagan County Purchasing Co., Inc., Fair Bldg., Fort Worth, Tex.
Barney Holland, *Pres.* D. A. Richardson, *V. P.* R. L. Roberts, *Sec.* and *Treas.* Neil Stallard, Texon, Tex., *Dist. Supt.* 20 miles, 6 and 8-in.

Republic Pipe Line Co., 223 Fourth Ave., Pittsburgh, Pa.
O. D. Robinson, *Pres.* D. W. Hovey and David D. Johnson, *V. P.s.* William H. Moreland, *Sec.* and *Treas.* E. L. Sauer, Houston, Tex., *Asst. Treas.* George E. Casey, *Supt.* Donald MacMillan, Corpus Christi, Tex., *Office Mgr.* 84 miles, 2 to 6-in.

Richardson Pipe Line Co., Fort Worth, Tex.
S. W. Richardson, *Pres.* M. E. Perry, *V. P.* and *Treas.* J. E. Hill, *V. P.* Wm. H. Morgan, *Sec.* J. W. La Mar, Sundown, Tex., *Supt.* 44 miles, 6-in.

Richfield Oil Corp., 555 S. Flower St., Los Angeles, Calif.
H. F. Sinclair, *Chm. Bd.* W. Alton Jones, *Chm. Fin. Committee.* Chas. S. Jones, *Pres.* W. T. Dinkins, A. M. Kelley, Frank A. Morgan, *V. P.s.* M. Richard Gross, *Treas.* W. T. Autrey, *Comp.* Cleve B. Bonner, *Sec.* E. B. Downey, *Asst. Sec.* and *Treas.* Leonard Switzer, *Asst. Sec.* A. H. B. Gore, *Supt.* Gordon B. Slater, *Div. Foreman.* E. T. Smith, *Engr.* L. A. Wilson, *Field Engr.* William Hoffman, *Const. Foreman.* 357 miles, 2 to 10-in.

Rusk Oil & Refining Co., Peoples Bank Bldg., Tyler, Tex.
H. H. Coffield, *Pres.* George P. Mann, *V. P.* and *Supt.* J. H. Edwards, *Sec. and Treas.* 8 miles, 4-in.

S

Scurlock Oil Co., Bankers Mortgage Bldg., Houston, Tex.
E. C. Scurlock, *Pres.* Dr. E. T. Clark, *V. P.,* Lufkin. W. C. Scurlock, *Sec. and Treas.* 60 miles, 2 to 4-in.

Shell Oil Co., Inc., (Pacific Coast Div.), 100 Bush St., San Francisco, Calif.
S. Belither, *Chm. Bd.* and *Exec. V. P.* Alexander Fraser, New York, *Pres.* D. Heggie, L. G. McLaren, F. S. Clulow, E. F. Davis, *V. P.s.* A. R. Bradley, *Asst. Sec.* J. H. White, *Asst. Treas..* F. B. Simms, *Mgr.* W. C. Roberts, *Asst. Mgr.* M. C. Alcorn, *Dist. Supt.* F. O. McKeany, *Ch. Dispacher,* 1008 W. Sixth St., Los Angeles. E. W. Jenkins, *Dist. Supt.* H. H. McQueen, *Asst. Dist. Supt.,* Box 329, Tracy. 646 miles, 3 to 12-in.

Shell Pipe Line Corp., Shell Bldg., Houston, Tex.
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Sinclair Refining Co., Pipe Line Dept., Independence, Kans.

J. R. Manion, E. H. Chandler, C. H. Kountz, *V. P.s.* R. B. Hanna, C. R. Lodge, *Asst. Sec.* and *Treas.* Chas. Fitzgerald, *Asst. to V. P.;* A. D. Sloan, *Gen. Supt.,* Fort Worth. W. R. Reed, J. J. Linehan, *Gen. Supts.;* W. E. Morrison, *Asst. Gen. Supt.;* C. E. Earle, *Supt. Highway Equip.;* W. F. Conry, *Div. Supt.;* L. F. McLaughlin V. H. Hilford, *Master Mechs.,* Tulsa. R. J. Tibbets, *Asst. Gen. Supt.;* J. T. English, *Supt. Maint.;* T. A. Myers, *Div. Supt.,* Kansas City. C. R. Parrish, *Supt.,* Casper, Wyo. D. R. Welch, *Supt. Tel. and Tel.;* M. J. Loftus, *Div. Supt.;* R. J. Osborn, *Dist. Foreman,* Independence, Kans. J. D. Moroney, Bartlesville, Okla.; Frank McFarland, Mexico, Mo.; R. B. Laughner, Galesburg, Ill.; L. B. Smith, Wichita Falls, Tex.; H. Wallender, Troup, Tex.; C. E. Christie, Mexia, Tex., *Div. Supts.* C. D. Welch, Wichita, Kans.; A. H. Donnewald, Shawnee, Okla., C. O. Shields, Borger, Tex., *Dist. Foremen.* 5,883 miles gathering lines. 6,497 miles trunk lines.

Skelly Oil Co., Skelly Bldg., Tulsa, Okla.

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Socony-Vacuum Oil Co., Inc., White Eagle Division, Federal Reserve Bank Bldg., Kansas City, Mo.

R. R. Irwin, *Gen. Mgr.;* H. K. Phipps, Wichita, Kans., *Gen. Supt. Crude Pipe Lines;* C. C. Durker, *Gen. Supt. Gasoline Pipe Lines;* L. R. Dickinson, Wichita, Kans.; *Ch. Engr.* 300 miles, 4 to 10-in.

Socony-Vacuum Oil Co., Inc., 26 Broadway, New York, N. Y.

John A. Brown, *Pres.* C. E. Arnott, F. R. Brown, G. V. Holton, H. F. Sheets, A. F. Corwin, *V. P.s.* Wm. D. Bickham, *Sec.* Arthur T. Roberts, *Treas.* 357 miles, 10-in.

Sohio Pipe Line Co., Midland Bldg., Cleveland, Ohio

W. T. Holliday, *Pres.* W. J. Semple, *V. P.* and *Treas.* S. A. Swensrud, J. F. Wilson, *V. P.s.* S. H. Elliott, *V. P.* and *Mgr. P. L. Dept.* E. F. Morrill, *Asst. Mgr.* Frank Volger, Mount Vernon, Ill.; F. A. Smith, Mooresville, Ind.; M. W. Walters, Mount Pleasant, Mich., *Div. Supts.* 1,245 miles, 3 to 12-in.

Southern Phillips Corp., 411 N. Broadway, Corpus Christi, Tex.

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Southern Pipe Line Corp., 2200 Grant Bldg., Pittsburgh, Pa.

Clarence M. Brown, *Pres.* J. H. Heroy, *V. P.* and *Sec.* Maston Nixon, Wm. B. Bell, H. L. Derby, K. F. Cooper, R. L. Clause, Harold Pitcairn, Raymond Pitcairn, Walter S. Landis, Frederick O. Pope, H. S. Wherrett, *V. P.s.* F. W. Currier, *Treas.* I. C. Hatridge, *Asst. to V. P.;* Arthur Elliott, *Auditor;* Joe L. Reed, *Supt.;* C. W. Pippin, *Asst. Supt.;* F. P. Peterson, Jr., *Const. Engr.,* Corpus Christi, Tex. 95 miles, 2 to 6-in.

Southern Pipe Line Co., 210 Seneca St., Oil City, Pa.

Allan T. Towl, *Pres.* T. C. Towl, Pittsburgh, *V. P.* and *Gen. Mgr.* J. M. Tussey, *V. P.* and *Treas.* E. W. Ziegler, *Sec.* L. J. Vangergrift, Lancaster, Pa., *Gen. Supt.* 268 miles, 6 to 12-in.

South West Pennsylvania Pipe Lines, 210 Seneca St., Oil City, Pa.

Allan T. Towl, *Pres.* T. C. Towl, *V. P.* and *Gen. Mgr.* J. T. Scally, Pittsburgh, *Engr.* J. M. Tussey, *V. P.* and *Treas.* W. H. Fisher, *Supt.* D. L. Jolly, *Supt. Tankage,* Washington, Pa. 1,779 miles, 2 to 10-in.

Standard Oil Co. of California, 225 Bush St., San Francisco, Calif.

H. D. Collier, *Pres.* J. H. Tuttle, R. C. Stoner, J. L. Hanna, A. S. Russell, *V. P.s.* B. W. Letcher, *Sec.* G. J. O'Brien, *Treas.* 275 miles, 6 to 12-in.

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Standard Oil Co. (Ohio), Midland Bldg., Cleveland, Ohio

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T

Taico Pipe Line Co., Mount Pleasant, Tex.

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Taylor Petroleum Co., Taylor, Tex.

G. L. Rowsey, *Pres.* W. C. McTarnahan, *V. P.* H. A. Melasky, *Sec.* and *Treas.* W. B. Arrington, *Asst. Treas.* J. H. Wells, *Supt.* R. R. Butler, *P. L. Dept.,* Corpus Christi, Tex. 7 miles, 2 to 6-in.

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Tidal Pipe Line Co., Box 731, Tulsa, Okla.

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Tide-Water Pipe Co., Ltd., The, 54 Boylston St., Bradford, Pa.

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Toronto Pipe Line Co., The, 507 Philtower Bldg., Tulsa, Okla.

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Transit & Storage Co., Sperry Bldg., Port Huron, Mich.

P. R. Naylor, *Pres.* G. A. Trenchard, *V. P.* and *Sec.* B. E. Ireson, *Treas.* and *Asst. Sec.* J. R. Simpson, *V. P.,* Toronto, Ont. Harry Wheatley, *Gen. Mgr.;* Jos. E. Letson, *Asst. Gen. Mgr.;* Herbert Tretz, *Supt. of Maintenance,* Wayne, Mich. 360 miles, 6 and 8-in.

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V

Valley Pipe Line Co., Commerce Bldg., Houston, Tex.

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Vickers Petroleum Co., The, 201 Wheeler-Kelly-Hagny Bldg., Wichita, Kans.

C. L. Henderson, *Pres.* H. G. Shaw, J. B. Smith, *V. P.s.* John S. Wertz, *Sec.* and *Treas.* A. M. Schrepfer, *Ref. Supt.;* R. N. Moore, *Asst. Supt.,* Potwin, Kans. John M. Little, *Prod. Supt.* Arnold S. Bunte, *Geologist.* J. J. Brown, *Land Supt.* J. B. Smith, *Sales Mgr.* H. G. Shaw, *Traf. Mgr.* and *Pur. Agt.* Mason C. Lyons, *Auditor.* 57 miles, 2 to 4-in.

W

Wabash Pipe Line Co., 35 E. Wacker Drive, Chicago, Ill.

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H. F. Wilcox, *Pres.* F. H. Dunn, *Exec. V. P.* M. P. Appleby, *V. P.* and *Treas.* C. L. Miller, *Sec.* W. M. Fraser, Bristow, Okla., *Ref. Supt.* W. R. Bingham, Tulsa, *Const. Supt.* E. E. Holden, Pampa, Tex., *Dist. Supt.* 127 miles, 2 to 6-in.

Y

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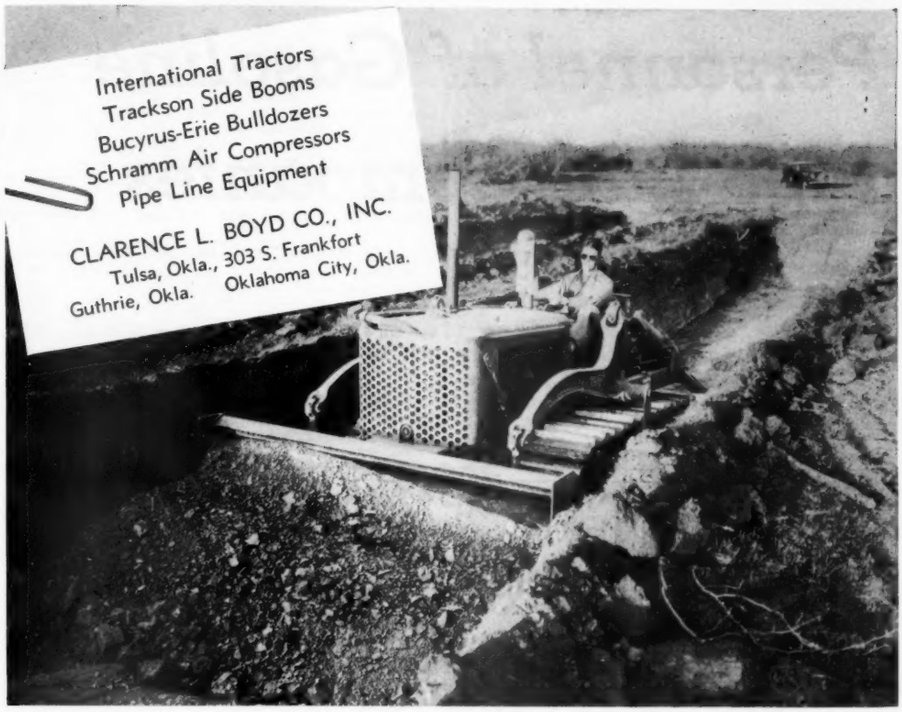

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B

Bell Oil & Gas Co., National Bank of Tulsa Bldg., Tulsa, Okla.

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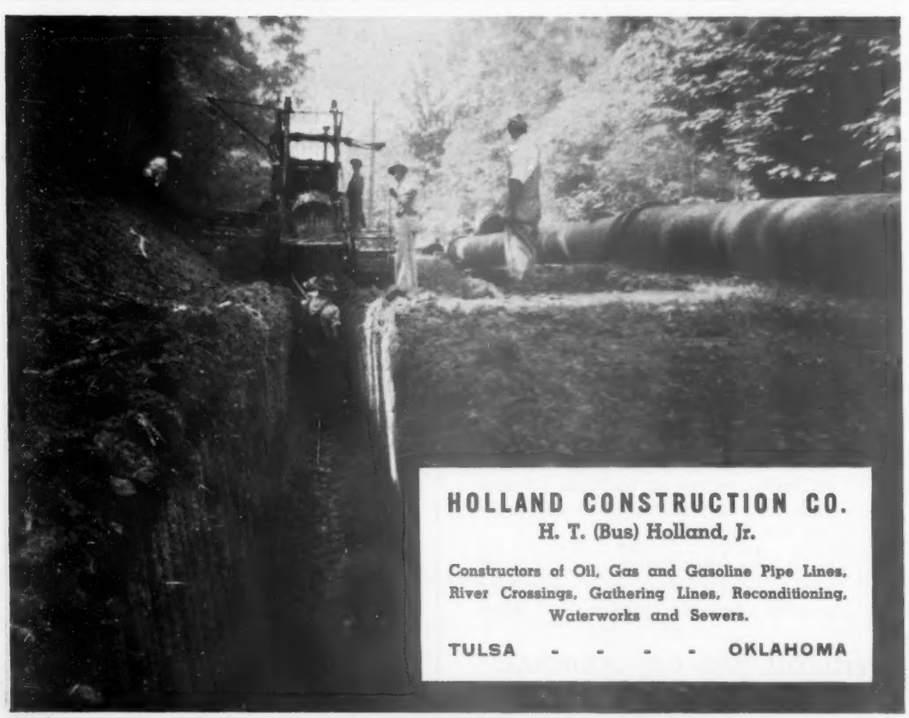

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C

Champlin Refining Co., Box 1078, Enid, Okla.

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D

Derby Oil Co., The, 352 N. Broadway, Wichita, Kans.

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C. B. Watson, *Pres.* D. D. Irwin, Henry Hauseman, *V. P.s.* C. H. Jay, *Sec.* and *Treas.* J. H. Botkin, *Comptroller.* D. E. Sullivan, *Ch. Engr.* George E. Weber, Hamtramck, Mich., *Supt.* 86 miles, 6-in.

E

East Texas Refining Co., Tower Petroleum Bldg., Dallas, Tex.

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G

Globe Oil & Refining Co., Union National Bank Bldg., Wichita, Kans.

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Great Lakes Pipe Line Co., Box 2239, Kansas City, Mo.

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H

Hanlon Pipe Line Co., Nat'l. Bank of Tulsa Bldg., Tulsa, Okla.

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K

Keystone Pipe Line Co., 260 S. Broad St., Philadelphia, Pa.

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L

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M

Magnolia Petroleum Co., Box 900, Dallas, Tex.

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N

National Transit Co., 206 Seneca St., Oil City, Pa.

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P

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R

Richfield Oil Corp., 555 S. Flower St., Los Angeles, Calif.

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S

Shell Oil Co., Inc., 50 W. 50th St., New York, N. Y.

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J. R. Manion, E. H. Chandler, C. H. Kountz, *V. P.s.* A. D. Sloan, Fort Worth, Tex., *Gen. Supt. Fort Worth-Dallas, Tex., line.* 31 miles, 3-in.

Socony-Vacuum Oil Co. (White Eagle Pipe Line Div.), 925 Grand Ave., Kansas City, Mo.

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Standard Oil Co. of California, 225 Bush St., San Francisco, Calif.

H. D. Collier, *Pres.* J. H. Tuttle, R. C. Stoner, J. L. Hanna, A. S. Russell, *V. P.s.* B. W. Letcher, *Sec.* G. J. O'Brien, *Treas.* 23 miles, 6-in.

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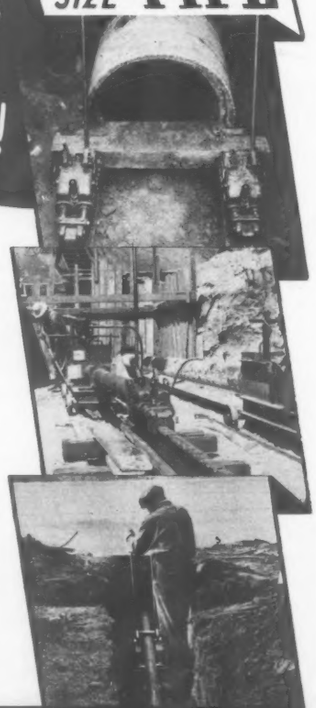

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Standard Oil Co. (Ohio), Midland Bldg., Cleveland, Ohio

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T

Tide Water Associated Oil Co., Associated Div., 79 New Montgomery St., San Francisco, Calif.

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Southern California Pipe Line System, P.O. Box 725, Wilmington, Calif.

F. E. Coyle, *Supt.;* W. S. Davidson, Jr., *Asst. to Supt.;* G. A. Reeve, *Supt. San Pedro Terminal;* E. A. Dissall, *Traveling Engr.;* F. H. Adams, *Ch. Engr. Watson;* A. L. Piper, *Field Engr.;* W. E. Gillfillan, Box 811, Ventura, Calif., *Foreman Ventura Terminal.* 9 miles, 6 and 8-in.

Tuscarora Oil Co., Ltd., P. O. Box 22, Harrisburg, Pa.

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U

Union Oil Co. of California, 617 W. 7th St., Los Angeles, Calif.

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United States Pipe Line Co., 35 E. Wacker Drive, Chicago, Ill.

D. D. Irwin, *Pres.* Henry Hauseman, *V. P.* C. H. Jay, *Sec.* and *Treas.* J. H. Botkin, *Comptroller.* D. E. Sullivan, *Ch. Engr.* E. A. McCadden, Marcus Hook, Pa., *Supt.* 58 miles, 5-in.

Personnel of Natural-Gas Pipe-Line Companies

A

Ambridge Gas Co., 467 Maplewood Ave., Ambridge, Pa.
F. C. Schroeder, Jr., *Pres.* and *Treas.* R. H. McCague, *V. P.* W. D. Ashenhart, *Sec.* and *Gen. Mgr.* 5½ miles, 4 and 6-in.

American Michigan Pipe Line Co., Muskegon, Mich.
Glen R. Chamberlain, *Pres.* Dean W. Flowers, *V. P.* G. J. Zorn, *Sec.* and *Treas.* Harry J. Gabel, Big Rapids, Mich., *Supt.* 114 miles, 3 to 8-in.

Argus Natural Gas Co., Inc., Omaha, Neb.
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Arkansas Louisiana Gas Co., Shreveport, La.
D. W. Harris, *V. P.* and *Gen. Mgr.* H. D. Hancock, J. R. Munce, *V. P.s.* A. H. Weyland, *V. P.* and *Gen. Supt.* T. J. Heard, *Sec.* B. R. Muirhead, *Treas.* H. T. Goss, *Ch. Engr.* J. Lucas, *Mgr. of Purchases.* 1,728 miles, 2 to 20-in.

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Arkansas Natural Gas Corp., Shreveport, La.
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B

Bellewood & Monongahela City Natural Gas Co., 113 Fourth St., Monongahela, Pa.
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Big Horn Gas Co., Basin, Wyo.
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C

Canadian River Gas Co., Colorado Springs National Bank Bldg., Colorado Springs, Colo.
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D

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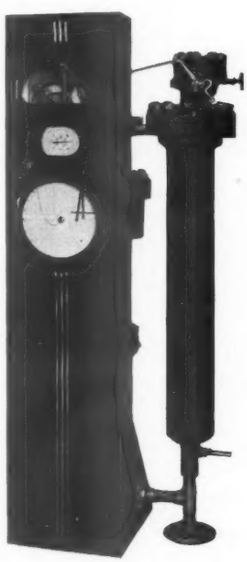

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F

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G

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H

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TANK BOTTOMS—Old crude oil tank bottoms can be Sealed Tight for long lasting service.

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NO-OX-ID protection against severe underground corrosion.

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NO-OX-IDIZED WRAPPERS

NO-OX-IDized Wrappers are designed especially for the protection of underground pipe lines.

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The Original Rust Preventive

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NO-OX-ID excludes moisture and other corrosion accelerators, contains chemical inhibitors which render passive any pits or corrosion that may be present when coating is applied. NO-OX-ID is easily applied by hand or machine, as required. NO-OX-IDized Wrappers applied by hand, traveling or stationary machines.

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I

Inland Gas Corp., 1409 Winchester Ave., Ashland, Ky.

Ben Williamson, Jr., *Trustee.* O. H. Horne, *Gen. Supt.* H. R. Stump, *Supt. Gas Measurement.* W. A. Horne, *Engr.* R. D. Soper, *Pur. Agt.* Ralph N. Thomas, *Geologist.* Mike Staley, Lackey, Ky., *Field Supt.* Jonas L. Miller, *Drilling Supt.* 354 miles, 2 to 16-in.

Interstate Natural Gas Co., Inc., 30 Rockefeller Plaza, New York, and P.O. Box 1482, Monroe, La.

F. H. Lerch, Jr., *Pres.* W. A. Dougherty, *V. P.* E. E. DuVall, *Sec.* James Comerford, *Treas.* John Gordon, *Gen. Mgr.* A. H. Salisbury, *Asst. Treas.* S. J. Struben, *Ch. Engr.* E. F. Blanks, *Field Supt.* Ed Lohan, J. B. Simonton, *Div. Supts.* 170 miles, 22-in.

Iowa-Nebraska Light & Power Co., Lincoln, Neb.

L. R. King, *Pres.* O. R. Mallat, *Sec.* and *Treas.* F. J. Gunther, *Asst. Gen. Mgr. Chg. Oper.* R. L. Schacht, *Asst. Ch. Engr.* H. Gildersleeve, *Asst. Gen. Mgr. Chg. Mdse.* E. P. Hennek, *Gas Supt.* 60 miles, 4 to 6-in.

K

Kansas-Nebraska Natural Gas Co., Inc., Phillipsburg, Kans.

L. E. Fischer, *Pres.* D. H. Holmes, G. W. Burton, S. D. Whiteman, *V. P.'s.* L. E. Nelson, *Sec.* D. H. Holmes, *Treas.* 1,150 miles.

Kentucky Natural Gas Corp., 423 W. Third St., Owensboro, Ky.

J. H. Hillman, Jr., *Pres.* C. A. Meyer, *V. P.* and *Treas.* W. J. Hinchey, *V. P.* and *Gen. Mgr.* L. E. Ingham, *V. P.* W. T. Stevenson, *Asst. Sec.* and *Treas.* H. C. Nunn, *P. L. Supt.* H. C. McKinley, *Prod. Supt.* J. L. Bugg, *Distribution Supt.* J. W. Polkinghorn, *Mgr. Land Dept.* J. A. Brown, *Geologist.* D. C. Benson, *Gas Measuring Engr.* C. E. Curry, *Ch. Engr.* Paul McElwain, *Dispatcher.* L. B. Benson, Vincennes, Ind., *Div. Supt.* W. J. Theis, Henderson, Ky.; R. L. Robards, Bowling Green, Ky., *Dist. Supts.* Robert Berry, Owensboro, Ky., *Dist. Supt.* S. T. Burns, *Warehouse Foreman.* Geo. C. Staves, *Mgr. Drlg. Dept.* H. F. Keith, *Pur. Agt.* E. J. Vairin, *Asst. Pur. Agt.* 831 miles, 2 to 12-in.

Kentucky-West Virginia Gas Co., Second National Bank Bldg., Ashland, Ky.

F. R. Phillips, *Pres.;* E. W. Washabaugh, *Sec.;* H. D. Megahan, *Treas.,* Pittsburgh, Pa. P. C. Von Gilst, *V. P.* H. W. Ruemmele, *Asst. Sec.* and *Treas.* P. E. Dufendach, *Gen. Supt.;* C. D. Hunter, *Ch. Geology* and *Research Dept;* Harry Byllesby, *Pur. Agt.;* H. L. Leg, *Land Agt.,* Ashland. Wm. Ward, *Prod. Supt.;* C. V. Kishpaugh, *Supt. Comp. Sta.;* E. E. Clark, *Supt. Realty,* Prestonburg, Ky. 526 miles. 2 to 16-in.

L

LeFlore County Gas & Electric Co., Poteau, Okla.

Charles T. Orr, *Pres.* Raymond F. Orr, *V. P.* C. B. Saviers, *Sec.* and *Treas.* H. A. Sickmann, *Field Supt.* Earl McCafferty, *Asst. Field Supt.* Geo. F. Allen, *Supt. Comp. Sta.* Henry Best, *Asst. Supt. Comp. Sta.* 84 miles, 6 to 8-in.; 16 miles, 4-in. leased.

Lion Oil Refining Co., Exchange Bldg., El Dorado, Ark.

Col. T. H. Barton, *Pres.;* T. M. Martin, A. F. Reed, J. J. Allinson, and J. E. Howell, *V. P.s;* Jeff Davis, *Sec.;* R. E. Meinert, *Treas.;* J. E. Howell, *V. P., Chg. of Prod. and Pipe Lines;* E. W. Hardage, *Gen. Supt., Prod. and Pipe Lines;* Joe B. Tims, *Pipe Line Supt.;* J. D. Kendrick, *Ch. Gager;* V. M. Speer, *Pipe Line Connection Foreman;* J. L. Nutt and J. D. Herring, *Pump Repairman;* L. O. Preddy, J. E. Coley, Sr., and V. E. Vaulbree, *Station Engrs.;* J. L. Greene, *Dist. Gager,* El Dorado; D. C. Ellen, *Dist. Gager,* Schuler. 22 miles.

Lone Star Gas Co., 1915 Wood St., Dallas, Tex.

D. A. Hulcy, *Pres.* R. A. Crawford, E. F. Schmidt, *V. P.s.* D. L. Cobb, *Sec.* and *Treas.* Julian L. Foster, *Gen. Supt.* and *Ch. Engr.;* L. T. Potter, *Supt. Prod.;* J. R. Jarvis, *Supt. Gaso. Dept.;* B. L. Rogers, *Supt. Comp. Dept.;* R. Vandercook, *Supt. P. L.;* A. W. Breeland, *Safety Supervisor;* R. A. Minter, *Office Engr.;* C. O. Diller, *Supt. Tel. Dept.;* D. A. Sillers, *Supt. Gas Measurement;* Harry Wheeldon, *Asst. Supt. Gaso.;* O. H. Moore, *Asst. Supt. Comp.;* W. A. Allred, *Asst. Safety Supervisor;* E. E. Stovall, *Asst. Supt. Gas Measurement;* J. P. Viglini, *Asst. Office Engr.;* B. R. Newberry, *Pur. Agt.;* W. G. Nash, *Asst. Pur. Agt.,* Dallas. W. F. Crook, Box 1313, Abiline, Tex.; H. B. Dempsey, Box 498, Ballinger, Tex.; Aubrey Boyd, Cayuga, Tex.; Tod Pazdral, Box 365, Irving, Tex.; T. E. Waddill, Rte. 6, Fort Worth, Tex.; J. N. Carpenter, Box 567, Gainesville, Tex.; W. G. Webb, Box 124, Gordon, Tex.; George Minton, Box 88, Joshua, Tex.; Mark Black, Box 398, Healdton, Okla.; Fred Smith, Box 253, Petrolia,

Tex.; E. K. Smith, Box 78, Ranger, Tex.; L. E. Southard, Box 348, Groesbeck, Tex.; L. E. DePew, Box 349, Shamrock, Tex.; Joe A. Martin, Box 1357, Vernon, Tex.; Eldon Glenn, Rte. 5, Waco, Tex.; *P. L. Foremen.* S. M. Gamble, Box 78, Ranger, Tex.; R. L. Shipp, Petrolia, Tex.; M. W. Crowder, Joshua, Tex.; C. W. Cardwell, Box 107, Shamrock, Tex.; W. E. Johns, Box 398, Healdton, Okla., *Div. Supts.* F. H. Townsend, Gordon, Tex.; H. C. Wells, Box 708, Hollis, Okla.; J. M. Phillips, Petrolia, Tex.; Joe Francis, Rte. 1, Cisco, Tex., *Supts.* 4,350 miles, 2 to 24-in.

Louisiana-Nevada Transit Co., 130 E. 12th St., Ada, Okla.

W. A. Delaney, Jr., *Pres.* and *Gen. Mgr.* C. Boettcher, C. E. Boettcher, *V. P.'s*, Denver, Colo. M. O. Matthews, *Sec.* and *Treas.* Martin A. Gehling, Hope, Ark., *Supt.* Vernon Roberts, *Attorney.* C. D. Perkins, Cotton Valley, La., *Div. Foreman.* 88 miles, 4 to 8-in.

M

Memphis Natural Gas Co., 931 Sterick Bldg., Memphis, Tenn.

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Mercer County Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.* A. C. Burwell, *V. P.* H. S. Rose, *Sec.* and *Treas.* P. L. Mulkin, *Dist. Supt.* C. P. Garvey, *Pur. Agt.*

Mississippi River Fuel Corp., 407 N. 8th St., St. Louis, Mo.

F. H. Lerch, Jr., *Pres.* Ben C. Comfort, *V. P.* and *Mgr.* Reid L. Carr, *Sec.* James Commerford, *Treas.* A. W. Sommerville, Geo. M. Parker, *Assts. to V. P. & Mgr.* H. D. Graham, *Ch. Engr.* F. J. Martin, *Asst. Ch. Engr.* K. A. Bosmyer, *Supt. Gas Measurments.* Geo. C. Crouse, *Supt. Land* and *Tax Dept.* J. W. Peisker, *Pur. Agt.* A. W. Joiner, *Supt. Comp. Sta.* W. K. Borland, St. Louis; L. M. Gibson, Pine Bluff, Ark., *Asst. Supts. Comp. Sta.* R. W. Bargar, Poplar Bluff, Mo., *Supt, Transmission Lines* A. G. Hoge, Monroe, La., *Chief Gas Dispatcher.* A. B. Willey, Crossett, Ark.; J. C. Lemon, Wilmar, Ark.; R. W. Hollis, Carlisle, Ark.; J. G. Reese, Newport, Ark.; J. N. Hart, Poplar Bluff, Mo.; C. R. Garrett, Zion, Mo.; J. A. Sullivan, Farmington, Mo., *Div. Foremen.* J. H. Young, Perryville, La.; T. C. McLellan, Star City, Ark.; R. E. Baum, West Point, Ark.; B. B. Bush, Biggers, Ark.; H. M. Gillespie, Zion, Mo.; A. L. White, Newport, Ark.; E. C. Collins, Sherrill, Ark.; E. H. Richardson, Crossett, Ark., *Sta. Engrs.* 679 miles, 2 to 22-in.

Monongahela West Penn Public Service Co., 306 Watson Bldg., Fairmont, W. Va.

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Mountain Fuel Supply Co., 539 S. Main St., Findlay, Ohio.

T. B. Gregory, *Chm. Bd.* and *Treas.* O. D. Donnell, *Pres.* C. R. Hetzler, J. D. Roberts, H. H. West, *V. P.'s.* F. B. Firmin, *Sec.* and *Asst. Treas.* L. C. Oipin, *Asst. Sec.* and *Treas.* 499.61 miles 3 to 18-in.

Mountain States Gas Co., 33 E. Wacker Drive, Chicago, Ill.

D. D. Irwin, *Pres.* Henry Hauseman, H. J. Lowe, *V. P.s.* C. H. Jay, *Sec.* and *Treas.* J. H. Botkin, *Comptroller* D. E. Sullivan, *Ch. Engr.* J. A. Waggoner, Dawes, W. Va., *Gen. Mgr.* C. V. Cannon, Cabin Creek, W. Va., *Supt.* 4 miles, 1 and 2-in.

Montana-Dakota Utilities Co., 831 Second Ave. South, Minneapolis, Minn.

C. C. Yawkey, Wausau, Wis., *Pres.* R. M. Heskett: Ben Alexander, Conway Bldg., Chicago, Ill., *V. P.'s.* A. P. Woodson, Wausau, Wis., *Sec.* F. R. Gamble, *Treas.* Cecil W. Smith, *Ch. Engr.* H. M. Frederickson, *Gas Engr.* A. F. Anderson, *Pur. Agt.* James Trimble, Bismark, N. D.; C. B. Aasness, Rapid City, S. D.; L. M. Wells, Sheridan, Wyo.; Robert Naylor, Miles City, Mont.; Noel Carrico, Glendive, Mont.; O. H. Bundy, Glasgow, Mont.; F. S. Marion, Havre, Mont.; Harlan Scott, Great Falls, Mont.; V. M. Cleaveland, Williston, N. D.; Ivar J. Swanson Crookston, Minn.; A. J. Ensteness, Missoula, Mont., *Div. Mgrs.* H. A. Schroth, Baker, Mont.; Clyde Keys, Shelby, Mont., *Gas Field Supts.* 1,235 miles, 2 to 12-in.

N

Natural Gas Pipeline Co. of America, 20 N. Wacker Drive, Chicago, Ill.

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New Mexico Eastern Gas Co., 1104 Burt Bldg., Dallas, Tex.

Albert S. Johnson, *Pres.;* C. H. Zachry, F. W. Smith and J. R. Cole, *V. P.s;* H. V. McConkey, *Sec.;* C. H. Zachry, *Treas.;* F. D. Bradley, *Pur. Agt.;* James C. Reid, *Engr.;* Van Thompson, *Measurement Dept.;* Scott Hughes, *Legal Dept.;* H. V. McConkey, *Accounting Dept.;* J. R. Cole, Santa Fe., N. M., *Gen. Mgr.;* E. W. Kelley, Clovis, N. M.; H. N. Oldham, Carlsbad, N. M., *Dist. Mgrs.;* J. D. Jackson, Portales, N. M.; Horace Echols, Tucumcari, N. M.; E. C. Reddy, Carlsbad, N. M.; Charles Gaskins, Artesia, N. M., *Town Plant Mgrs.* 246 miles, 2 to 8-in.

New Mexico Gas Co., Burt Bldg., Dallas, Tex.

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New York State Natural Gas Corp., 545 William Penn Way, Pittsburgh, Pa.

E. M. Borger, *Pres.;* E. E. Du Vall, *Sec.;* S. J. Ratcliffe, *Treas.;* John J. Jacob, Jr., *Exec. Asst. to Pres.;* J. M. Chilcote, *Supt. of Prod.;* E. C. Inghram, Box 65, Lawrenceville, Pa.; *Dist. Supt.;* A. C. Boyer, Box 129, Lawrenceville, Pa., *Dist. Engr., Station Dept.* 266 miles, up to 20-in.

North East Heat & Light Co., 16 N. Lake St., North East, Pa.

Stephens T. Lockwood, *Pres.* Charles O. Zimmerman, *V. P.* and *Sec.* Robert I. Thompson, 218 Center St., East Aurora, N. Y., *Treas.* and *Supervising Mgr.* John G. Watt, *Local Rep.* 20½ miles, 1 to 8-in.

Northern Natural Gas Co., Omaha, Neb.

B. R. Bay, *Pres.* H. J. Carson, *V. P.* J. F. Merriam, *Sec.* and *Treas.* A. B. Dilworth, *Comptroller* and *Asst. Treas.* R. J. Organ, *Gen. Counsel.* B. H. Harper, *Asst. Sec.* George E. Calvin, *Asst. Treas.* H. J. Carson, *Ch. Engr.* J. P. Bristow, *Asst. Ch. Engr.* S. W. Taft, *Supt. of Transmission.* John M. Hanley, *Prod. Engr.* C. F. Martin, *Pur. Agt.* R. L. Harrison, *V. P.* and *Supt. of Distribution—Peoples Natural Gas Co.* and *Argus Natural Gas Co., Inc.* 3,007 miles, 2 to 26-in. (includes Argus lines).

Northern Oklahoma Gas Co., Ponca City, Okla.

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Northern Utilities Co., Casper, Wyo.

J. H. McIntire, *Pres.;* W. A. Blind, *V. P.* and *Treas.;* C. H. Lavin, *V. P.;* R. E. Burke, *Sec.;* L. E. Hoadley, *Asst. Sec.-Treas.* 237 miles, transmission lines; 107 miles, distribution lines.

Northwestern Natural Gas Co., Grandview, Wash.

Erik H. Nelson, *Trustee.* Earl Tinus, *Mgr.* J. H. Mann, *Supt.* 1 mile, 10-in.; 27 miles, 6-in.; 12 miles, 4-in.; 5 miles, 3-in. 300-hp. booster station.

Northwestern Utilities Limited, 10124 104th St., Edmonton, Alberta, Canada.

H. R. Milner, *Pres.* E. W. Bowness, *V. P.* Julian Garrett, *Gen. Mgr.* J. B. Whelihan, *Sec.* and *Treas.* E. F. McGarvey, *Asst. Sec.* and *Treas.* G. W. Green, *Gen. Supt.* H. R. Brooks, Viking, Alta., *Field Supt.* F. G. Imler, Tofield, Alta., *Trans. Supt.* A. J. Danes, *Dist. Supt.* E. Nelson, *Ch. Engr.* B. W. Pitfield, *Asst. Engr.* R. F. Allan, *Asst. Engr.* 349 miles to 12¾-in.

O

Ohio Fuel Gas Co., The, 99 N. Front St., Columbus, Ohio.

C. I. Weaver, *Pres.* E. M. Tharp, *V. P.* and *Gen. Mgr.* P. S. Clapp, T. H. Kerr, W. L. McCloy, *V. P.s.* P. A. Alberty, *Sec.* W. N. Grinstead, *Treas.* C. C. Phillips, *Mgr. Trans.* J. H. Lang, *Supt. P. L.* G. S. Beitler, *Asst. Supt. P. L.* P. W. Rogers, *Engr. P. L.* D. R. Croft, *Supt. Comp. Dept.* F. F. Fisher, R. H. Meyers, *Gen. Engrs. Comp. Dept.* John Adams, Sugar Grove, Ohio; G. J. Baxter, Pavonia, Ohio; R. D. Weaver, Athens, Ohio; L. D. Myers, Homer, Ohio, *Div. Supts.* W. C. Gundelfinger, Athens, Ohio; S. I. Parcell, Wooster, Ohio; D. B. Walker, Brentnell Ave., Columbus; C. L. Leibengood, Galion, Ohio, *Div. Supts.* 6,470 miles, 2 to 24-in.

Oklahoma Natural Gas Co., 7th & Boston, Tulsa, Okla.

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Head Gas. Meas. Dept. W. L. Rinaman, *Head Land & Lease.* R. S. Huffman, *Head Safety Dept.* H. J. Chambers, *Trans. Head.* W. A. Hazard, *Dist. Trans. Supt.* J. E. Mineo, *Dist. Supt.*, Tulsa. T. A. Wood, *Dist. Supt.;* T. H. Sterling, *Dist. Mgr.*, Oklahoma City. Jack Gillis, *Dist. Supt.;* Geo. W. Brinkley, *Dist. Mgr.*, Ardmore. C. R. Shiers, *Dist. Supt.;* J. A. Ray, *Dist. Mgr.*, Enid. W. G. Van Arsdale, *Dist. Supt.;* P. V. Root, *Dist. Mgr.*, Muskogee. Lee Prokop, *Dist. Supt.;* F. E. Padden, *Dist. Mgr.*, Shawnee. W. W. Bruce, *Dist Mgr.*, Chandler. C. E. Cloud, *Dist. Mgr.*, Iola, Kans. 4,243 miles, 2 to 16-in.

Oklahoma Utilities Co., 123½ W. 7th, Bristow, Okla.

R. C. Poage, *V. P.* J. L. Miller, *Sec.* and *Treas.* A. C. Wright, *Gaso. Plant Supt.* 71 miles, 2 to 6-in.

Ottumwa Gas Co., 225 E. Main St., Ottumwa, Iowa

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P

Pacific Gas & Electric Co., 245 Market St., San Francisco, Calif.

J. B. Black, *Pres.* P. M. Downing, *V. P.* and *Gen. Mgr.* D. H. Foote, *V. P., Sec.* and *Treas.* A. E. Wishon, *V. P.* and *Asst. Gen. Mgr.* J. P. Coghlan, *V. P.* and *Asst. to Pres.* W. G. Vincent, *V. P.* and *Exec. Engr.* R. E. Fisher, *V. P. Chg. Public Relations* and *Sales.* R. S. Fuller, *Engr. Operations.* F. F. Doyle, *Mgr. Natural Gas Div.* F. Wills, *Engr. Prod.* H. J. Smith, *Engr. Const.* 8,788 miles.

Panhandle Eastern Pipe Line Co., 1221 Baltimore Ave., Kansas City, Mo.

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Panhandle Pipe Line Co., Amarillo, Tex.

R. E. Wertz, *Pres.* E. A. Sickels and M. D. Snyder, *V. P.s.* Geo. Baird, *Sec.* and *Treas.* E. C. Wagner, *Gen. Supt.* F. F. Ford, *Foreman.* 33¼ miles 3 to 8-in.

Panhandle Power & Light Co., Borger, Tex.

C. R. Stahl, *Gen. Mgr.* L. J. Roberts, *Asst. Mgr.* J. G. Cabbell, *Asst. Sec.* and *Treas.* A. W. Nelson, *Supt. Gas Dept.* 49 miles, 5 to 7-in.

Penn-York Natural Gas Corp., 518 Jackson Bldg., Buffalo, N. Y.

T. W. Tutwiler, *Pres.* E. P. Hindes, J. R. Reeves, *V. P.s.* E. E. McWhiney, *Sec.* and *Treas.* R. A. Balcom, Belmont, N. Y., *Gen. Foreman.* 145 miles, 6 to 10-in.

Peoples Natural Gas Co., Omaha, Neb.

R. L. Harrison, *V. P.* and *Supt. of Distr.*

Peoples Natural Gas Co., 545 William Penn Way, Pittsburgh, Pa.

E. M. Borger, *Pres.* S. C. Preston, *V. P.;* J. B. Sayers, *Sec.;* S. J. Ratcliffe, *Treas;* John J. Jacob, Jr., *Exec. Asst. to Pres.;* J. M. Chilcote, *Supt. of Operations;* L. E. Ostrye, *Supt. of City Plants;* A. C. Perry, *Ch. Mechanical Engr.;* R. J. Plank, *Ch. Civil Engr.;* Fred A. Bankert, C. D. Altman, R.D. No. 1, Mayport, Pa.; C. R. Spencer, Apollo, Pa.; G. E. Walker, Waynesboro, Pa.; L. C. King, Murrysville, Pa.; M. R. McKinley, Monongahela, Pa., *Dist Supts.;* H. W. Hoffman, Brave, Pa.; George R. Gibson, Imperial, Pa.; Glenn G. Gibson, Box 460, McKeesport, Pa.; B. P. Stewart, R.D. No. 6, Kittanning, Pa., *Dist. Engrs., Station Dept.* 2,497 miles, transmission lines; 1,643 miles, distribution lines.

T. W. Phillips Gas & Oil Co., 205 N. Main St., Butler, Pa.

T. W. Phillips, Jr., *Pres.* B. D. Phillips, *V. P.* and *Treas.* C. A. Wiler, *Sec.* 2,000 miles, 2 to 12-in.

Pittsburgh & West Virginia Gas Co., 435 Sixth Ave., Pittsburgh, Pa.

F. R. Phillips, *Pres.* F. F. Schauer, *V. P.* E. W. Washabaugh, *Sec.* H. D. Megahan, *Treas.* H. H. Pigott, *Gen. Supt. Prod.* and *Trans.* J. H. Newlon, *Supt. of Prod.* and *Geologist.* Judson Bonsall, *Supt. Comp. Sta.;* G. N. Neilson, *Asst. Supt.;* J. F. Ashenhart, *Supt. Div. "F";* Clyde Pritchard, *Asst. Supt. of Div. "F,"* Clarksburg, W. Va. G. L. Hinerman, *Supt. of Div. "K";* F. W. Fest, *Asst. Supt.,* Waston, W. Va. 1,400 miles, 1 to 20-in.

Public Service Co. of Oklahoma, 600 S. Main, Tulsa, Okla.

R. K. Lane, *Pres.* J. A. Whitlow, J. P. Arnold, C. N. Robinson, *V. P.s.* R. F. Frank, *Sec.* E. E. Ehret, *Treas.* M. M. Schene, *Dist. Mgr.;* C. J. Goodspeed, *Supt. of Const.* and *Oper.;* Jess Clanton, *Foreman;* James F. Dominic, *Supt.,* McAlester, Okla. 109 miles, 6 to 10-in.

Public Service Corp. of Texas, 902 Burkburnett Bldg., Fort Worth, Tex.

William Horwitz, *Pres.* Thomas Cook, S. B. Horwitz, *V. P.'s.* I. E. Horwitz, *Sec.* M. A. Berman, *Treas.* H. J. Boisdorf, Perryton, Tex., *Supt.* George Clennan, Perryton, Tex.; Ivan Conklin, Canadian, Tex.; O. W. Elliott, Mobeetie, Tex.; Cecil Henson, Shattuck, Okla., *Branch Mgrs.* 231 miles, 4 to 6½-in.

R

Reidsburg Natural Gas Co., Clarion, Pa.

C. E. Deitz, *Pres.* E. E. Deitz, *Sec., Treas.* and *Gen. Mgr.* 2 miles, 2-in.

Republic Light, Heat & Power Co., Inc., 518 Jackson Bldg., Buffalo, N. Y.

H. D. Hancock, *Pres.* S. B. Severson, *V. P.* and *Gen. Mgr.* J. A. Richie, *Sec.* and *Treas.* J. B. Reeves, *Gen. Supt.* F. Fair, *Prod. Supt.* J. F. Sweeny, Dunkirk, N. Y.; C. F. Henderson, Batavia, N. Y., *Div. Supts.* H. E. Merrill, *Supervisor Engr. Dept.* G. M. Merrill, *Engr.* W. H. Mott, *Measurement Engr.* 134 miles, 6 to 8-in.

Ridgway Natural Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.* J. G. Montgomery, Jr., *V. P. Chg. Prod.* A. C. Burwell, *V. P. Chg. Engr.* H. S. Rose, *Sec.* and *Treas.* P. L. Mulkin, *Dist Supt.* C. P. Garvey, *Pur. Agt.*

Rio Gas & Power Co., 812 Maverick Bldg., San Antonio, Tex.

Terry A. Hornaday, *Pres.* Fred A. Hornaday, Jr., *V. P.* and *Treas.*, Rio Grande City, Tex. A. A. Blondin, *Sec.* L. G. Johnson, Menard, Tex; Buster Gunn, Eldorado, Tex., *Mgrs.* 32 miles to 4-in.

Rio Grande Valley Gas Co., Brownsville, Tex.

O. P. Wilson, *Pres.;* J. C. Jordan and R. B. Lloyd, *V. P.s;* James T. Jackson, *Sec.;* W. H. Meredith, *Asst. Treas.;* C. A. Irwin, *Pipe Line Supt.;* R. T. McMinn, *Auditor;* H. H. McIntire, *Pur. Agt.;* J. K. England, Harlingen, Tex.; R. W. Fenwick, Edinburg, Tex.; Mike Groom, McAllen, Tex.; J. T. Spettigue, Mercedes, Tex.; W. A. Young, Mission, Tex.; Guy Pierce, Raymondville, Tex.; D. W. Day, San Benito, Tex.; C. D. Bennett, Weslaco, Tex., *Local Mgrs.* 502 miles.

River Gas Co., The, 324 Fourth St., Marietta, Ohio.

H. B. Schum, *Pres.* J. C. Chisler, *V. P.* and *Treas.* Denton Borger, *Sec.* C. C. Reed, Clarksburg, W. Va., *Gen. Supt.* John W. Dow, *Agent;* James W. Nolan, *Foreman,* Marietta, Ohio. R. A. Droppleman, Woodsfield, Ohio, *Foreman.* 261 miles, 2 to 12-in.

Rocky Mountain Gas Co., The, Casper, Wyo.

H. H. Healy, *Pres.* W. B. Emery, *V. P.* J. A. Lee, *Sec.* and *Treas.* W. M. Holland, *Gen. Mgr.* G. F. Poe, *Gen. Supt.* R. M. Miller, Lovell, Wyo.; H. O. Kapp, Rawlins, Wyo., *Supts.* J. W. Adams, Cody, Wyo.; J. T. Fuller, Lovell, Wyo.; W. J. Nowlan, Powell, Wyo.; E. P. Murphy, Rawlins, Wyo.; W. W. Husted, Laramie, Wyo.; A. Anderson, Craig, Colo., *Local Agts.* 212.9 miles, 3 to 10-in.

S

Santa Maria Gas Co., 203 West Main St., Santa Maria, Calif.

R. E. Easton, *Pres.;* F. S. Wade, *first V. P.;* R. W. Miller, *second V. P.;* L. P. Scaroni, *Sec.;* R. E. Easton, *Treas.* and *Gen. Mgr.;* A. T. Fesler, *Gen. Supt.* and *Asst. Gen. Mgr.;* C. W. Hatch, *Gen. Auditor, Asst. Sec.,* and *Pur. Agt.;* R. B. Bruce, *Asst. Gen. Supt.* and *Gas Engr.;* H. F. Wilber, *Asst. Gen. Auditor;* F. Paulus, *Asst. Sec.* and *Sec. to Pres.;* I. S. Keyser, *Mgr., Utilization Dept.;* Edward Marquart, Lompoc, Calif.; P. Hawkins, Pismo Beach, Calif.; C. W. Charles, San Luis Obispo, Calif.; P. M. Graham, Paso Robles, Calif., *Local Mgrs.* 378 miles, 2 to 8-in.

Smethport Natural Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.* J. G. Montgomery, Jr., *V. P. Chg. Prod.* A. C. Burwell, *V. P. Chg. Engr.* H. S. Rose, *Sec.* and *Treas.* P. L. Mulkin, *Dist. Supt.* C. P. Garvey, *Pur. Agt.*

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Southern Natural Gas Co., Watts Bldg., Birmingham, Ala.

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Southern Union Gas Co. (and subsidiaries), Burt Bldg., Dallas, Tex.

A. C. Johnson, *Pres.;* F. W. Smith, Ross Byron, and C. H. Zachry, *V. P.s;* H. V. McConkey, *Sec.;* C. H. Zachry, *Treas.;* F. D. Bradley, *Pur. Agt.;* James C. Reid, *Gen. Supt;* Van Thompson, *Supt., Measurement;* J. D. Reid, *Supt., Land, Lease, and Prod.;* Raymond Harrison, *Tax and Insurance;* Scott Hughes, *Legal Dept.* 1,433 miles, 2 to 12-in.

Southwest Natural Gas Co., 802 Commercial National Bank Bldg., Shreveport, La.

Charles G. Laskey, *Pres.* George Belchic, *V. P.* Alexander Pinney, *Sec.* R. M. Craigmyle, *Treas.* M. C. Bubenzer, *Ch. Engr.* R. H. Curry, Haynesville, La., *Gen. Mgr. La. Dist.* H. F. Adlam, Lockhart, Tex., *Gen. Mgr. Texas Dist.* C. A. Breitung, Ada, Okla.

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Same guaranteed construction as the Water Can. Has larger top opening, and 1" insulator in bottom.

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R. K. Lane, *Pres.* S. I. McElhoes, Harry W. Pitzer, *V. P.s,* Chickasha, Okla. C. W. McIlhenny, *Sec.* and Treas. Wm. Schumacher, *Ch. Gas Engr.;* E. W. Shull, *Gas Supt.;* J. S. Boyett, *Dist. Mgr.,* Newton, Okla. J. T. Thompson, *Gas Supt.;* M. Douglas Parks, *Dist. Mgr.,* Chickasha, Okla. A. P. Burns, Duncan, Okla.; H. W. Cotner, Altus, Okla., *Local Mgrs.* 259 miles, 4 to 8-in.

State Fuel Supply Co., 1320 Petroleum Bldg., Oklahoma City, Okla.

M. T. Drisko, *V. P.;* Ray K. Osburn, *Sec.-Treas.;* Earl J. Newlin, *Asst. Sec.-Treas.;* Earl Fox, *Engr.;* T. R. Smith, Wewoka, Okla.; C. L. Boone, Anadarko, Okla., *Dist. Mgrs.;* F. D. Carpenter, Cement, Okla.; M. T. Riley, Rush Springs, Okla.; A. H. Cox, Carnegie, Okla.; G. A. Hutchinson, Lindsay, Okla.; B. W. Perkins, Laverne, Okla., *Local Mgrs.* 143 miles, 2 to 7-in.

State Line Gas Co., 306 Watson Bldg., Fairmont, W. Va.

A. C. Spurr, *Pres.* J. K. Buchanan, O. F. Lough, C. H. Leatham, *V. P.s.* G. J. Jackson, *Sec.* C. H. Luessow, *Treas.* G. W. Harr, *Mgr.* J. W. Allison, *Gen. Supt.;* R. G. Crawford, *Field Supt.,* Morgantown, W. Va. B. W. Cordray, Point Marion, Pa., *Local Rep.* 35 miles, 2 to 8-in.

St. Marys Natural Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.* J. G. Montgomery, Jr., *V. P. Chg. Prod.* A. C. Burwell, *V. P. Chg. Engr.* H. S. Rose, *Sec.* and *Treas.* P. L. Mulkin, *Dist. Supt.* C. P. Garvey, *Pur. Agt.*

Susquehanna Gas Co., Ninth and Hamilton Sts., Allentown, Pa.

J. S. Wise, Jr., *Pres.;* L. W. Heath, *V. P.;* C. M. Walter, *Sec.-Treas.* 82 miles, 3 to 14-in.

T

Texoma Natural Gas Co., 20 N. Wacker Drive, Chicago, Ill.

W. A. Jones, *Pres.* Floyd C. Brown, *V. P.* S. E. Campbell, *Sec.* E. H. Johnston, *Treas.* E. V. Kesinger, *Gen. Supt.* R. T. Powers, *Supt. of Oper.* H. E. Smith, *Supt. P. L.* W. H. Davidson, *Supt. Comp. Sta.* W. T. Bulla, *Supt. Tel. & Tel.* R. G. Strong, *Supt. P. L. Const.* J. G. Dickinson, Rule Bldg., Amarillo, Tex., *Supt. of Prod.* G. W. Gibbs, Box 36, Fritch, Tex., *Gen. Supt.* L. D. Williams, *Supt. Dist. 1;* E. C. Hammerschmidt, *Ch. Chem.;* H. R. Rohwedder, *Asst. Supt.,* Box 87, Fritch, Tex. 350 miles, 4 to 24-in.

Triangle Co., P.O. Box 100, McKees Rocks, Pa.

J. B. Montgomery, *Pres.* John H. Montgomery, *Sec.* S. H. Morgan, *Treas.* A. A. Bock, *Eng.* 13 miles, 1½ to 3-in.

Turner Gas & Oil Co., Clarion, Pa.

20 miles, 2-in.

Twin City Pipe Line Co., Fort Smith, Ark.

A. B. Harper, *Pres.;* J. C. Blair, *V. P.;* R. A. DeLong, *Sec.-Treas.;* John Henson, *Supt.;* J. B. Johnson, *Drilling Supt.;* George Wirtzies, Ozark, Ark., *Compressor Supt.* 200 miles, 2 to 10-in.

U

Union Gas Co. of Canada, Chatham, Ont., Canada

S. A. Morse, *Pres.* and *Gen. Mgr.;* D. A. Coste, *First V. P.;* R. L. O'Brian and D. P. Rogers, *V. P.s;* T. Weir, *Comptroller* and *Sec.-Treas.* 1,704 miles, up to 16-in.

Union Gas System, Inc., Independence, Kans.

Paul R. Johnson, *Pres.;* Donald W. Stewart, *V. P.* and *Sec.;* Harry F. Mitchell, *Treas.;* Frederick Louis Rupp, *Mgr. Town Plants;* Harrison F. Johnson, *Mgr. New Business Dept.;* Vernon F. Palmer, *Mgr. Pipe Lines;* L. J. Love, *Gen. Supt.;* W. L. Orr, *Pur. Agt.;* Zeke White, Independence, Kans.; C. A. Lloyd, Caney, Kans.; Porter Graves, Coffeyville, Kans.; Clyde Myers, Fredonia, Kans.; George Priestley, Olathe, Kans., *Dist. Supts.;* Charles W. Studt, *V. P.* and *Geologist,* Sagamore Oil & Gas Co., producing subsidiary of Union Gas System, Inc. 717 miles.

United Carbon Co., United Carbon Bldg., Charleston, W. Va.

Oscar Nelson, *Pres.* G. A. Williams, T. F. Koblegard, T. S. Reed, *V. P.s.* C. H. McHenry, *Sec.* T. A. Whelan, *Treas.* Arthur Hanson, *Asst. Sec.* C. A. Urban, *Asst. Treas.* C. L. Staats, *Gen. Supt. Land Dept.,* I. G. Grettum, *Engr. Gas Dept.;* R. V. Sleeth, *Agent Land Dept.,* Charleston, W. Va. Darius Morris, *Supt.;* E. T. Tawney, *Asst. Supt.;* E. W. Fitzwater, *Meterman,* Clendenin, W. Va. R. S. Bailey, Campbellsville, Ky., *Gen. Mgr.* Taylor-Green Gas Co. E. F. Hagans, *Supt.* Kentucky; C. R. Payne, *Meterman,* Pikeville, Ky. H. W. Engstrom, *Gen. Supt.* Louisiana and Kansas; H. E. Norrick, *Supt.* Louisiana; L. G. Clements, *Asst. Supt.* Louisiana; Clyde Burkholder, *Meterman,* Monroe, La.; S. I. Bennett, Satanta, Kans., *Supt.* W. F. Seeger, *Gen. Supt.* Texas; S. O. Reeder, *Asst. Gen. Supt.,* Borger, Tex. C. K. Springfield, Sayre, Okla., *Gen. Supt.* Oklahoma. E. H. Shinn, Aransas Pass, Tex., *Supt.* 6,000 miles up to 24-in. (including 70 miles leased).

United Fuel Gas Co., Quarrier & Dunbar Streets, Charleston, W. Va.

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United Gas Pipe Line Co., Box 1407, Shreveport, La.

N. C. McGowen, *Pres.* R. H. Hargrove, *V. P.* and *Gen. Mgr.* M. A. Abernathy, *V. P.* J. H. Miracle, *Sec.* A. L. McClellan, *Treas.* E. R. Cunningham, *Gen. Supt. Main P. L.* A. D. Greene, *Ch. Engr.* Ed Parkes, *Gen. Supt Field P. L.* A. D. Bradford, *Gen. Supt. Comp. Sta.* W. F. Fulton, *Supt. Chem.* and *Gasoline Dept.* R. C. Appling, *Supt. Tel. & Tel.* R. L. Rountree, *Gen. Measurement Supt.* H. F. Carr, P.O. Box 710, Baton Rouge, La.; A. P. King, P.O. Box 711, Beeville, Tex.; J. E. Bahan, P.O. Box 719, Dallas, Tex.; E. M. Smith, P.O. Box 2492, Houston, Tex.; J. D. Davis, P.O. Box 1178, Jackson, Miss.; J. G. Hicks, P.O. Box 1422, Monroe, La.; E. F. Humes, P.O. Box 421, San Antonio, Tex.; F. E. Lacaze, Shreveport, La.; F. B. Winbery, P.O. Box 296, Iowa, La.; W. W. Clopton, P.O. Box 780, Wichita Falls, Tex., *Dist. Mgrs.* 5,028 miles, to 22-in. (includes 78 miles leased lines).

United Natural Gas Co., 308 Seneca St., Oil City, Pa.

George E. Welker, *Pres.* J. G. Montgomery, Jr., *V. P. Chg. Prod.* A. C. Burwell, *V. P. Chg. Engr.* H. S. Rose, *Sec.* and *Treas.* P. L. Mulkin, *Dist. Supt.* C. P. Garvey, *Pur. Agt.*

Upham Gas Co., Mount Vernon, Ohio

R. M. Craigmyle, *Pres.;* J. A. Upham, *V. P.;* A. O. Dawson, *Sec.;* P. B. Snodgrass, *Asst. Sec.;* C. W. Rockhold, *Asst. Treas.* 91 miles.

W

West Texas Gas Co., Lubbock, Tex.

A. R. Jones, *Pres.* R. F. Hinchey, P. C. Spencer, M. D. Snyder, *V. P.s.* Geo. Baird, *Sec.* and *Treas.* E. C. Wagner, Amarillo, Tex., *Gen. Supt.* E. A. Dudley, *Asst. Gen. Supt. of P. L.;* T. J. Sutherland, *P. L. Supt.,* Lubbock, Tex. E. B. Mitchell, Plainview, Tex., *Supt.* J. S. LeGate, Fritch, Tex., *Gasoline Plant Supt.* 798 miles, 2⅝ to 15-in.

Wheeler Gas Co., Wheeler, Tex.

H. M. Wiley, *Mgr.-Owner.* Max Wiley, *Asst. Mgr.* Ray Lee, *Plant Supt.* 54 miles, 3-in.

Z

Zenith Gas System, Inc., Alva, Okla.

W. L. Woodward, *Pres.* Lewis A. Robertson, *V. P.* H. L. Hayden, *Sec.* and *Treas.* C. W. Mann, *Gen. Supt.* E. L. Moore, Cherokee, Okla.; B. O. Young, Hardtner, Kans.; Clair Schnoebelen, Mooreland, Okla.; D. E. Frieden, Waynoka, Okla.; W. R. Ritchey, Quinlan, Okla.; Wm. Flury, Avard, Okla., *Plant Mgrs.* 197 miles ¾ to 6⅝-in.

●

Illinois Pipe Line Delivers Crude To Tank Cars at Martinsville, Ill.

To relieve the strain on facilities, Illinois Pipe Line Co. is delivering 14,000 bbl. daily to a 20-car loading rack at Martinsville, Ill. Shipments totaling 60 cars are loaded daily. To avoid delays at the loading rack, the railroad has assigned a locomotive especially for transferring cars. It is reported that tank-car trains are given preference over passenger trains and that a 60-car train can be delivered to the Standard Oil Co. of New Jersey refinery at Bayway, N. J., in 50 hours.

Texas-Empire Reduces Tariffs For Shipments to Chicago Area

Effective September 16, Texas-Empire Pipe Line Co. has reduced tariffs for shipments of crude oil to refineries in the Chicago area. The tariff for shipments from the Mid-Continent area has been reduced from 34½ to 30 cents per barrel; the tariff for shipments of oil from Illinois fields dropped from 20 to 15 cents per barrel.

Pipe-Line Activity

Ickes May Request Pipe For Big Defense Line

With the return of Coordinator Harold L. Ickes to Washington, D. C., early this week, it was reported that he would revive immediately the effort to obtain priorities from the SPAB for approximately 430,000 tons of steel to build the $80,000,000 crude-oil pipe line from Longview, Tex., and Wood River, Ill., to the Philadelphia-New York area which has been planned by National Defense Pipe Lines, Inc.

Construction of Plantation Project Is Progressing

Construction work on the new Plantation pipe line is now under way at several points. Pipe is being laid near Baton Rouge, La. Right-of-way is being cleared and pipe is being strung near the state lines between Louisiana and Mississippi, Mississippi and Alabama, Alabama and Georgia, and Georgia and South Carolina.

The ground survey of the entire main line has been completed, 84 per cent of the right-of-way has been purchased, 50 per cent of the pipe has been received, and soon from 8 to 12 crews will be at work so that this vital link in national defense can be finished during the winter.

The Plantation pipe line, with its lateral lines, will be 1,261 miles long, running from Baton Rouge to Greensboro, N. C. The area it will serve has more army training camps than any other section of comparable size in the country.

This southeastern area now is largely dependent upon water-borne traffic for its petroleum products. The 2,300,000 trucks, buses, passenger cars and tractors in this section currently consume 47,000,000 bbl. of gasoline a year. The Plantation pipe line, operating at normal capacity, can supply 21,900,000 bbl. annually, or 33,950,000 bbl. at peak capacity. There will be 16 pumping stations, including one at Baton Rouge, to insure the steady flow of refined products.

Storage plants with capacities running up to 500,000 bbl. each are being, and will be, constructed at strategic points along the line.

Seven bulk-storage terminals with a combined capacity of 1,440,000 bbl. will be erected along the route of the line, the largest at the line's terminus in Greensboro. These stations will be erected by the Standard Oil Co., one of the participants in the construction of the line.

The Greensboro terminal will have storage capacity for 496,500 bbl. It will be located on a 30-acre plot and, in addition to the tank farm, will have a 100 by 150-ft. warehouse, a tank-truck loading rack capable of handling four trucks simultaneously and a tank-car loading rack which will serve 12 cars at one time. The station will be capable of handling 5,000,000 bbl. a year.

The remaining terminals and their capacities will be: Chattanooga, 105,000 bbl.; Knoxville, Tenn., 243,000 bbl.; Belton, S. C., 138,000 bbl.; Spartansburg, S. C., 117,500 bbl.; Charlotte, N. C., 227,000 bbl.; and Salisbury, N. C., 113,000 bbl. All terminals except that at Belton will be equipped with blending plants. The tankage will be for gasoline, fuel oil, kerosene, and tractor fuel which the line will handle.

The Plantation Pipe Line Co. is owned by the Standard Oil Co. (Kentucky), Shell Union Oil Corp., and Standard Oil Co. (New Jersey).

Phillips Extends Gathering System for Judkins Plant

Phillips Petroleum Co. has awarded a contract to Rogers & Vaughn Construction Co., Inc., for laying approximately 19 miles of pipe in sizes varying from 2 to 8-in. which will extend the gathering system of the company's gasoline plant at Judkins, Tex., in order that it may connect with wells at the south end of the field from which natural gas is supplied for the operation of the plant.

Reverse Flow of Tuscarora Pipe Line to Aid in Shortage

Reversal of flow of the Tuscarora pipe line in order to supplement crude deliveries to New York instead of carrying refined products westward has been announced by the petroleum coordinator.

The line, owned by Standard Oil Co. of New Jersey, runs from Bayway, N. J., to Midland, Pa., on the Ohio River. It had a capacity of 32,000 bbl. of refined products daily. As a crude line, it will deliver approximately 25,000 bbl. daily.

Reversal of the line will cost an estimated $250,000 to $300,000 because of the necessity of relocating the pumping stations. The company hopes to complete the work within 30 to 60 days.

The crude oil will probably be delivered to Midland principally by barges, moving up the Mississippi and Ohio rivers from the Texas and Louisiana Gulf Coast. There is also the possibility of using rail transportation if cars can be obtained.

The Tuscarora line was built originally as a crude line, to tap connecting lines, bringing oil from the Mid-Continent fields. However, with the shift to tanker transportation in the early twenties, the line was discontinued and remained idle for about 5 years. It was converted to a products line in 1930, so now returns to its original function.

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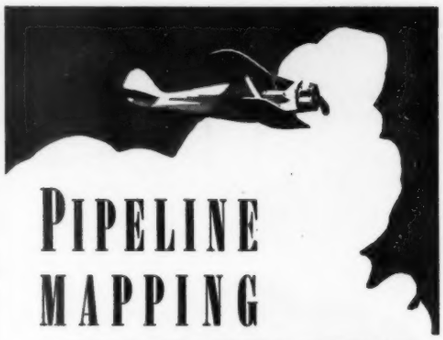

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THE SPIRIT OF '41

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FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

Completions reported during the past week totaled 687, the same as the week before. Oil wells were up 1, gas wells up 22 and dry holes were 23 fewer. Contrary to many predictions at the beginning of the year, completions to date are well ahead of those reported during the corresponding period of last year and there is no sign as yet that this year will see a repetition of last year's rapid decline in activity.

It is interesting to note that 7,344 completions have been reported since the end of the first half year or approximately one-third of the total to date. During the past 75 days, completions have been at the rate of 98 a day compared with 80 during the first 6 months of the year.

With the exception of Illinois, North Central Texas, Michigan, New Mexico and the coastal districts, all of the major producing areas are either as active or more active than last year. The declines in these areas are due mainly to the fact that drilling campaigns in one or two major fields have ceased and no large new developments are taking their place. The decline in the Louisiana and Texas Gulf Coast is also in large part due to the greater depths involved. This affects drilling in several ways. The cost is great, particularly in Louisiana where access to locations is often difficult. This high cost of drilling would slow up activity even in competitive fields, but there is a tendency for operators to delay drilling tests until they are amply protected by a large block of acreage, thus reducing competitive drilling. The trend toward wider spacing also reduces drilling rates as operators push their way out from discoveries much more slowly in 1,320-ft. jumps than on 10-acre spacing.

Despite the great amount of drilling, the week's news is not marked by any startling discovery. Present indications are that new reserves discovered this year will more than balance withdrawals but the new additions to reserves consist of a large number of relatively small fields rather than a few hundred-million-barrel fields in one or two states. This makes for better balance throughout the country and is responsible in part at least for the present excellent statistical position of the industry.

During the first 6 months of the year, the greatest percentage deficiency of new oil found was in Wyoming, Louisiana, and Oklahoma. The Apache discovery in Oklahoma and four new coastal fields within a month in Louisiana will go far in rectifying this situation.

ILLINOIS: The discovery well of the new Devonian pool in Clinton County flowed 250 bbl. of oil and water around the casing shoe. It is being completed (p. 246).

ALABAMA: First production for the state may come from a Clarke County test now nearing the 11,500-ft. mark. It reported shows in three zones (p. 247).

WEST TEXAS: The Ellenburger discovery outpost to the Todd field has been plugged back to the regular pay and extends production in that sand. Western Crockett County's discovery well southeast of Noelke has been gaged (p. 244).

TEXAS GULF COAST: Gas-distillate production is indicated from the Marginulina and Frio sands in the Needville area, Fort Bend County. Martha is extended on the south side (p. 234).

OKLAHOMA: Prospects for a second pool near Guthrie are bright as a test south of town is running high. An abnormal high, running as much as 4,000 ft. above some expectations may mark a new granite ridge in Bryan County. After many years of testing, the area immediately north of the Arbuckles appears to have a new gas field (p. 233).

KANSAS: A test between the Doran and Haferman pools is showing oil in the Kansas City-Lansing and Arbuckle. Kraft is extended ½ mile. After several years of inactivity, Trego County is again being prospected. Saturated Arbuckle lime has been found in a test in the eastern part of the county (p. 241).

CALIFORNIA: Good-looking Vedder sand has been cored in the Dyer Creek prospect in Kern County. The San Fernando section of Los Angeles County, in which some water wells have shown oil, is to be tested. Following the discovery of the 11,000-ft. pay at Ventura Avenue, several wells are planned to that horizon. Some will be deepened from the 9,500-ft. level. A test in the Cat Canyon field is picking up markers almost 1,000 ft. above the Los Flores producer which was recently completed (p. 230).

LOUISIANA GULF COAST: The fourth discovery within a month has been completed at Lake Chicot. At two of the other new fields, the discovery wells at Bastian Bay and Lapeyrouse are being recompleted. A new offshore pool is in prospect off Iberia Parish. Gas-distillate production is extended at Pecan Lake and a new sand has been found on the flank of the Welsh dome (p. 237).

EAST TEXAS: A north outpost to Chapel Hill is being completed in the Pettit and Paluxy pays. Field operations as well as wildcatting are on the increase (p. 232).

MICHIGAN: Several wells showing water or having low production appear to define the Reed City pool (p. 245).

WEST CENTRAL TEXAS: A new pay has been found below the Swastika sand in Noodle Creek. Nolan County's discovery well of last year was about to be abandoned but started making an increased flow following a shot. It is being recompleted (p. 228).

NORTH TEXAS: Shallow production has been found in Throckmorton County. A wildcat in southwest Young County reports a saturated sand at 2,700 ft. (p. 228).

ARKANSAS: Tide Water's wildcat west of McKamie reports showings in three horizons (p. 235).

NORTH LOUISIANA: The Larto Lake discovery well in Catahoula Parish made 146 bbl. of oil from the Wilcox, extending the trend play to the southeast. A wildcat in the Grand Cane area of De Soto Parish made a good flow from the Austin chalk (p. 235).

SOUTHWEST TEXAS: A new field has been found 1½ miles northeast of Luby. Oil production has been established on the northeast flank of Agua Dulce and a test on the southwest flank of Stratton is near the pay. A fourth producing sand has been found at Odem. New production has been found east and southwest of South Campana (p. 243).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended September 13, 1941)

	Oil	Gas	Dry	Total	1941 total comp. to date	1940 total comp. to date
N. Y., Pa., and W. Va.	95	20	6	121	4,134	3,899
Ohio	15	21	11	47	1,156	1,083
Kentucky	5	16	11	32	461	400
Indiana	4	1	0	5	359	276
Illinois	80	0	8	88	2,442	2,685
Michigan	5	2	10	17	606	816
Kansas	29	0	16	45	1,539	1,302
Nebraska	0	0	3	3	67	25
Missouri, Iowa	0	0	0	0	25	30
Oklahoma	18	2	6	26	1,324	1,330
Texas:						
North Central Texas	33	0	20	53	1,897	1,983
West Texas	44	1	7	52	1,554	1,384
Texas Panhandle	20	0	1	21	443	414
East Texas	22	0	3	25	756	410
Texas Gulf Coast	15	1	7	23	769	856
Southwest Texas	19	1	15	35	1,285	1,572
Total Texas	153	3	53	209	6,702	6,619
North Louisiana	19	2	5	26	501	425
Louisiana Gulf Coast	14	1	6	21	625	740
Total Louisiana	33	3	11	47	1,126	1,165
Arkansas	3	1	0	4	131	119
Mississippi and Southeast	1	0	2	3	177	149
Montana	4	1	4	9	197	159
Wyoming	2	1	3	6	134	118
Colorado, Utah	0	0	0	0	25	12
New Mexico	4	0	0	4	205	478
California	17	0	4	21	787	738
Total United States	468	71	148	687	21,597	21,403
Total previous week	467	49	171	687		
Week ended Sept. 14, 1940	402	37	143	582		

NORTH CENTRAL TEXAS

Shallow Production Found in Throckmorton County

By D. H. STORMONT

WICHITA FALLS, Tex., Sept. 15.—Operations in this district this week held to a steady pace. No definite results of the activity are yet apparent but in most cases the indications are encouraging. Eight counties in the North Texas district shared the benefits of the action of operators.

Shallow production for southern Throckmorton County has been found at the A. B. Collier 1 Mrs. Lee Tuton on the west side of the A. J. Kemp Survey. The well rated 8 to 10 bbl. daily on pump from a sand at 740 to 745 ft. At the end of the week the same operator was moving material ¼ mile northwest to drill 1 O. L. Kunkel, S.P. Survey 1. The new test is ½ mile west of the Ledbetter-Tuton pool.

In Clay County, L. T. Burns has completed 1 Hodges, Block 63, Belcher Survey, as the second producer in the Strawn sand pool in the southwestern part of the county and a north offset to the discovery well. The well flowed 81 bbl. of oil and swabbed 33 bbl. in 6 hours with only a trace of water. Saturated sand was drilled from 3,800 to 3,815 ft. This is the same depth from which the discovery produces. The well is bottomed at 3,938 ft.

The Bridwell Oil Co., Chapman & McFarlin et al 1 M. Fowler, John Massie Survey, in northwestern Montague County this week reported a slight show of oil from 5,180 to 5,187 ft. However, a core taken from 5,187 to 5,200 ft. returned 6.66 ft. of dry limy shale so operators continued drilling below 5,208 ft. Previously saturated conglomerate was encountered at 4,847-57 ft. and a drill-stem test recovered free oil.

No. 1 Fowler is 3 miles east of the Henson Brothers conglomerate discovery well, which in turn is southeast of the Ringgold deep conglomerate pool, northwest Montague County.

Another North Texas wildcat reported oil shows during the week. The Panhandle Refining Co. 1 Allar-Hunt was setting 7-in. casing at 2,700 ft. after drilling a heavily saturated oil sand from 2,700 to 2,708 ft. Location of 1 Allar-Hunt is in the NE cor. Section 3409, T.E.&L. Survey, southwest Young County.

Three miles south of the Antelope area of Jack County, the wildcat test drilled by Rankin & Elliott at 1 W. T. Stewart, Block 2799, T.E.&L. Survey, has been completed. The well pumped 160 bbl. of oil in 24 hours. Operators had previously shot the well with 50 qt. in an effort to increase production but no increase was noted. Production is from a sand at 3,488-3,501 ft., plugged back from 4,527 ft.

Wildcats Staked in Archer, Cook Counties

Two wildcats are planned for Archer County. The Phillips Petroleum Co. has staked 1 Pendery, SW NW Section 13, Block 4, H.&T.C. Survey, Abstract 213. The wildcat will be drilled with rotary to 5,600 ft.

The second test will be drilled by the Sunray Oil Co. at 1 C. W. Seibold, 467 ft. north and 560 ft. west of the southeast corner of Block 4, S.P. Survey, Abstract 939. Operator plans to test the Ellenburger lime with a 5,000-ft. contract.

Six miles east of Gainesville, J. L. Anderson has staked location for a 2,500-ft. wildcat on the A. L. Osburn land. Location is 330 ft. from the east and 990 ft. from the south lines of a 100-acre lease in the B. Sullivan Survey, Abstract 581.

NORTH TEXAS COMPLETIONS

Wildcats

Clay County: L. T. Burns 1 Wynn, Sec. 34, H. Williams Sur. A-704, old well drilled deeper, 73 bbl. in 3 hr., ¾-in. choke, est. 275 bbl., 6,000 gal. acid, oil sand 4,415-16 ft., old T.D. 5,206 ft., top Caddo 5,375 ft., Mississippi 5,891 ft., pay 5,905-67 ft.
Norwood & Waggoner 1 Huff, J. Bradshaw Sur. A-17, dry at 1,205 ft.
Shell Oil 2 Coleman "A," E. W. Tyree Sur. A-835, 650 bbl. in 3 hr., 2½-in. casing outlet, est. 3,500 bbl., top Caddo 5,853 ft., Mississippi 6,152 ft., pay 6,152-6,286 ft.
Cooke County: Humble 1 Felderholt, Sec. 24, George Ivy Sur. A-516, dry at 1,865 ft.

SUMMARY OF COMPLETIONS

North Texas

	No.	Bbl.	Footage
Oil wells: K.M.A.	5	1,511	17,979
Other fields	2	525	8,744
Miscellaneous pools	3	3,839	11,693
Wildcats	17	2,638	33,763
Dry holes: Miscellaneous pools	9	.....	8,578
Wildcats	4	.....	6,596
Total	40	.....	87,353

West Central Texas

	No.	Bbl.	Footage
Oil wells: Fields	6	916	16,300
Miscellaneous pools	1	37	830
Fields	1	.....	2,333
Miscellaneous pools	1	.....	985
Wildcats	5	.....	8,878
Total	14	.....	29,326

Falls Refg. 1 Drane Foundation, E. Langford Sur. A-366, dry at 1,752 ft.
E. N. Brochman and Phillips 1 Cotton, Bushnell Garner Sur. A-396, dry at 1,350 ft.
Metzner & Wallace 1 White, G. G. Steele Sur. A-1061, top Ellenburger 1,620 ft., dry at 1,629 ft.
Montague County: Shell 1 Alice Thomas, Sec. 95, Kaufman C.S.L. Sur. A-407, 64 bbl. in 24 hr., pumping, 57-qt. shot 3,032-47 ft., top Ellenburger 4,144 ft., P.B. from 4,646 ft.

Fields

Hull-Silk, Archer County: Blackwell Oil & Gas and Helmerich & Payne 14 Wilson, Sec. 25, Lot 14, A.T.N.C.L. Sur., 52 bbl. in 3 hr., 1-in. choke, est. 275 bbl., 3,847-64 ft.
K.M.A., Wichita County: Hammon, Hanlon & Buchanan 1 Fassett & Tuttle, E.T. Sur. A-76, 74 bbl. in 3 hr., ¾-in. choke, est. 290 bbl., top K.M.A. 3,805 ft., 120-qt. shot, 3,951-75 ft.
King Oil 1 Waggoner, M. A. Willis Sur. A-548, 25 bbl. in 24 hr., 430-qt. shot, 3,805-3,908 ft., P.B. from 4,000 ft.
Consolidated 32-Ellb. Ferguson, Sec. 11, W. H. Spillers Sur. A-257, 265 bbl. in 3 hr., est. 875 bbl., ¾-in. choke, top K.M.A. 3,670 ft., Ellenburger 4,185 ft., 3,000 gal. acid, 4,185-4,299 ft.
Tide Water and Perkins-Cullum 1 Pettit "State Texas," Chas. Pettit Sur., 50 bbl. in 3 hr., ¾-in. choke, est. 250 bbl., 270-qt. shot, 3,849-3,940 ft.
Perry Browning 8 Simpson, Lot 33, R.W.V.F. Lds. Sur., 71 bbl. in 24 hr., pumping, 1,758-65 ft.
Walnut Bend, Cooke County: Sinclair Prairie 6 Cox "A," Sec. 59 Fannin C.S.L. Sur. A-1214, 80 bbl. in 6 hr., ½-in. choke, est. 250 bbl., perf. casing 4,881-91 ft., P.B. from 4,980 ft.

Miscellaneous Pools

Archer County: P. C. Burns 1 Wilson, Sec. 117, Lot 1, A.T.N.C.L. Sur., top Gunsight lime 1,386 ft., dry at 1,430 ft.
W. W. McCarty 1 Abercrombie, Sec. 152, Harrin Subd. Club Ranch Sur., dry at 1,256 ft.
P. L. Andrews 1 Longley, J. B. Hinds Sur. A-184, 12 bbl. in 24 hr., pumping, 878-88 ft.
Chas. Wolverton, Jr., 2 Bearden "A," J. Riley Sur. A-364, top Gunsight 1,048 ft., dry at 1,121 ft.
Baylor County: British American 12 Turberville, Sec. 197, T.&N.O. Sur., 108 bbl. in 24 hr., 14 bbl. water, 1,000 gal. acid, 2,502-09 ft.
Clay County: Sussex Oil 5 Hamilton, Sec. 83, Dyers Bros. subd., 50 bbl. in 24 hr., pumping natural, 1,296-1,301 ft.
Johnson & Kouri 5 Taylor, Sec. 39, Bacon's subd., 23 bbl. in 12 hr., est. 35 bbl., pumping natural, 1,107-34 ft.
Perkins & Cullum 1 Taylor "C," Sec. 43, Bacon's subd., 10 bbl. in 24 hr., 1,095-1,104 ft.
George Golden 4 First Texas Joint Stock Land Bank "C," Blk. 13, Thornberry subd., 65 bbl. in 24 hr., pumping natural, 1,114-32 ft.
George Graham 8 Hansard, Sec. 8, Thornberry subd., 61½ bbl. in 12 hr., est. 75 bbl., pumping natural, 1,119-38 ft.
George Graham 17 Hansard, Sec. 8, Thornberry subd., 70 bbl. in 24 hr., pumping natural, 1,142-50 ft.
C. L. Ganaway 8 Stephenson "A," L. Longardio Sur. A-287, dry at 241 ft.
George Graham 16 Hansard, Sec. 8, Thornberry subd., 76 bbl. in 16 hr., pumping natural, est. 90 bbl., 1,131-45 ft.
Gorman & Christie 5 Taylor, Blk. 43, Bacon's subd., 49 bbl. in 24 hr., pumping natural, 1,103-20 ft.
C. L. Ganaway 4 Goetze, Sec. 2, F. Longardio Sur., dry at 245 ft.
Continental and Superior-Dillard 3 Ross, W. Walker Sur. 4-703, 241 bbl. in 6 hr., ¾-in. choke, est. 550 bbl., 8,000 gal. acid, 200-qt. shot, 5,615-5,718 ft., top Caddo 5,375 ft., Ellenburger 5,770 ft., perf. casing 5,375-5,505 ft.
Cooke County: Bridwell Oil 16 Flusche "B," Clark Sur. A-194, dry at 1,657 ft.
Jack County: George Weber 3 Brannon-Smith, F. B. Anderson Sur. A-1666, dry at 346 ft.
Elmore Oil 1 Myers, J. N. Rudmose Sur. A-1803, 55 bbl. in 6 hr., est. 125 bbl., 2,386-88 ft., P.B. from 2,395 ft.
Montague County: Lesh & McCall 5 Davenport, J. Fitch Sur. A-277, old well drilled deeper, old T.D. 2,373 ft., 250 bbl. in 24 hr., ¼-in. choke, 2,471-84 ft.
Wichita County: Chas. Morrison 1 Daniels, Anderson and Salines Sur. A-1 and 261, dry at 1,382 ft., no shows.
W. N. Hrohn 1 Jennings "C," Sec. 8, H.&T.B. Sur., 4 bbl. in 24 hr., 434-37½ ft., T.D. 455 ft.
Wilbarger County: J. A. Woods & Sons 2-D Womack, Sec. 1, Blk. 7, H.&T.C Sur., 20 bbl. oil and 8 bbl. water in 24 hr., pumping, 1,764-72 ft.
Young County: E. D. Willis 3 Stewart, Sec. 2, E.L. Sur. A-1824, dry at 900 ft., no shows.
Panhandle Ref. and Rankin 2 King & Wooten, Sec. 1977, T.E.&L. Sur., 242 bbl. in 13 hr., ¼-in. choke, est. 325 bbl., 2,757-2,814 ft.
Henry Zweifel 2 Pistola "B," J. Cunningham Sur. A-1720, 266 bbl. in 7 hr., ½-in. choke, est. 600 bbl., top Caddo lime 3,866 ft., pay 3,935-60 ft.
Henry Zweifel 4 Martin, R. W. Nabors Sur. A-213, 333 bbl. in 10 hr., ¼-in. choke, est. 450 bbl., 1,000 gal. acid, top Caddo 3,776 ft., pay 3,915-76 ft.

New Pay Zone Found In Noodle Creek Field

FORT WORTH, Tex., Sept. 15.—Production from a new pay level in the East Noodle sector of the 15-year-old Noodle Creek field of southwestern Jones County was in sight as the week ended. The Humble Oil & Refining Co. 4 Huddleston, Section 49, Block 18, T.&P. Survey, a northwest outpost, found an oil sand below the regular Swastika pay and filled at the rate of 5 bbl. per hour from 2,976-81 ft.

Two Offsets Staked to Taylor County Pool Extender

With the ½-mile extension to the Peckman-Perry pool of northern Taylor County apparently assured, operators have staked two offsets to the extension well. The Stanley Oil Co. has staked a diagonal northwest offset to the new well at 1 B. Morgan, in the southeast corner of Subdivision 8, Grimes County School Land Survey 124.

A direct west offset to the Lewis 1 Huddleston is being rigged up by W H. Peckman on the Buford land, 330 ft. out of the northeast corner of Subdivision 5, Grimes County School Land Survey.

The pool extender, Lewis Production Co. 1 Huddleston, was estimated at 100 bbl. daily, natural, from 2,619-26 ft. The pay zone is in a lime between the lower Hope and King sections and corresponds to the pay section of the W. D. Brookover 1 Church, Wimberly pool extension in southern Jones County.

Nolan County Wildcat Discovery Revived

New completion attempts are under way at the Metcalf Oil Co. 1 S. C. Tipton, Section 53, Block 19, T.&P. Survey, 2 miles southwest of Trent in Nolan County. This test was completed in February 1940 and promised the county its first oil production by pumping 9 bbl. daily from the Strawn sand at 5,171 ft.

Several weeks ago operators decided to abandon the well and went back in the hole to shoot casing around 4,000 ft. in order to pull pipe. Following the shot the well flowed 96 bbl. of oil and 1 bbl. of water in 12 hours. This was at first thought to be accumulated oil. However, the flow held up and at the end of the third day approximately 500 bbl. of oil and 5 bbl. of water had flowed into storage. At the end of the week operators were running tubing to test.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Comanche County: L. H. Choate 1 Pearl Kirk, P. D. Crump Sur. A-1905, dry at 2,820 ft.
Menard County: W. F. Sorrels 1 Wilkerson, C. A. Zimmermann Sur. A-827, Sec. 1549, temporarily abandoned at 300 ft.
Shackelford County: Kleiner & Dickery 2 Miller, 2,125 ft. from NW and 950 ft. from SW lines Sec. 571, T.E.&L. Sur., dry at 572 ft.
Kleiner & Dickery 3 Miller, 1,570 ft. from NW and 2,150 ft. from SW lines Sec. 571, T.E.&L. Sur., dry at 880 ft.
Aragon Oil 1 Walls Pasture, Sec. 39, B.A.L. Sur., top Caddo 3,575 ft., Ellenburger 4,192 ft., gas sand 3,660-80 ft., dry at 4,323 ft.

Fields

Avoca, Jones County: King Oil 4 Olson, Sec. 189, B.B.B.&C. Sur., 104 bbl. in 11 hr., est. 200 bbl., top Palo Pinto 3,201 ft., pay 3,201-21 ft.
Bluff Creek, Shackelford County: Fain-McGaha 6 Morris, Sec. 197, E.T. Sur., 106 bbl. in 24 hr., 15-qt. shot 1,478-89 ft., P.B. from 1,565 ft.
Higgs, Jones County: George Callihan 1 Higgs, W. T. Scott Sur. 2, 96 bbl. in 16 hr., natural, est. 125 bbl., 1,582-88 ft.
Lewis, Jones County: Butler & Horne and Miller 3 Lenderman, Sec. 5, T.&P. Sur., Blk. 15, dry at 2,333 ft.
Novice, Coleman County: States Oil 10 Morris, J. P.

(Continued on Page 236)

Fair Gas Completions in Ohio And Eastern Kentucky

By STAFF CORRESPONDENT

NEWARK, Ohio, Sept. 15.—Completions in the Ohio fields continued at the normal pace. Fair Clinton sand gassers were reported in Ashland, Holmes, Muskingum, and Tuscarawas counties. A Morgan County test at the southern end of the Brush Creek pool is dry through the Clinton and Medina horizons at 4,355 ft.

In Harrison County, Washington Township, East Ohio Gas Co. 2 W. Phillips is drilling ahead in the lime at 4,050 ft. Top of the Onondaga was had at 3,890 ft.

SUMMARY OF COMPLETIONS

Indiana

	No.	Bbl.	Footage
Oil wells	4	373	5,916
Gas wells	1	*0.4	683
Total	5	.....	6,599

Ohio

	No.	Bbl.	Footage
Oil wells	15	241	17,916
Gas wells	21	*13.4	46,787
Dry holes	11	.....	17,434
Total	47	.....	82,137
Recompletions	3	*0.1	.....
Input wells	6	.....	3,087

Eastern Kentucky

	No.	Bbl.	Footage
Gas wells	16	*6.6	46,760
Dry holes	2	.....	3,045
Total	18	.....	49,805

*Million cu. ft.

The Clinton sand oil pool in Clayton Township, Perry County, Ohio, is still undefined, excepting on the east side. The latest fair well was Pure 2 Jesse A. Cannon, NE Section 7, which produced 190 bbl. the first day along with 100,000 cu. ft. of gas from the Clinton sand, total depth 3,270 ft.

OHIO COMPLETIONS

Ashland County

Lake Township: Wittmer Co. 1 D. G. Chandler, Sec. 3, dry, Clinton sand absent, T.D. 2,856 ft.
Perry Township: Price et al 6 John Harpster, Sec. 17, 5 bbl., shot, Berea, T.D. 679 ft.
Sullivan Township: Ohio Fuel 1 Carl Sprinkle, Lot 77, 1,000,000 cu. ft. gas, Clinton, T.D. 2,656 ft.

Athens County

Ames Township: Ohio Fuel 1 C. E. Wooley, Sec. 6, 40,000 cu. ft. gas, shot, second Berea, T.D. 1,410 ft.; (old well deepened from Maxon).
Bern Township: Bern O. & G. 1 Myron Kenny, Sec. 11, 720,000 cu. ft. gas, stray, T.D. 916 ft.
Carthage Township: Ohio Fuel 2 W. S. Snodgrass, Sec. 31, 85,000 cu. ft. gas, first Berea, T.D. 1,708 ft.; (old well deepened from Maxon).
Ohio Fuel 6 Lula Tedrow, Fraction 23, dry, Injun sand, T.D. 1,334 ft.
Lodi Township: Ross, Weimer & Ross 10 G. P. Ackley, Sec. 19 at Pratts Fork, dry, Mitchell sand, T.D. 431 ft.

Cuyahoga County

Mayfield village: Benedum-Trees 1 Henry Franz, Lot 20, 730,000 cu. ft. gas, Oriskany, T.D. 1,886 ft.

Gallia County

Cheshire Township: C. A. Cody 1 Rufus Grover, Sec. 18, 200,000 cu. ft. gas, shot, second Berea, T.D. 1,788 ft.

Guernsey County

Center Township: Frank Stranges 1 J. O. Spear, Sec. 7, dry through Gordon, T.D. 2,062 ft.
Cambridge Township: James Ronshausen 1 Charles H. Keiffer, Sec. 16, 40,000 cu. ft. gas (some water), shot, Berea, T.D. 1,116 ft.

Hocking County

Ward Township: Preston 200 Sunday Creek Coal Co., Sec. 17, 500,000 cu. ft. gas, Clinton, T.D. 3,449 ft. Ohio Fuel 203 Sunday Creek Coal Co., Sec. 10, 860,000 cu. ft. gas, Berea, T.D. 1,136 ft.

Knox County

Butler Township: Brooks Johnson 1 Cevilla Bricker first quarter, 150,000 cu. ft. gas, Berea, T.D. 679 ft.
Howard Township: N. T. Shorts 1 E. L. Gardner, Sec. 16, 5 bbl., Clinton sand, T.D. 2,778 ft.
Union Township: Ohio Fuel 2 H. C. Whitney, NW Sec. 24, 1,500,000 cu. ft. gas, Clinton, T.D. 2,949 ft.
Knox Exploration Co. 1 Avery Yearous, SW Sec. 19, 1 bbl., Clinton, T.D. 2,928 ft.
Perkins & Upham 2 Harley Workman, NE Sec. 6, dry, Clinton, T.D. 2,790 ft.

Holmes County

Richland Township: Ohio Fuel 1 J. F. Fites, Sec. 5, 1,100,000 cu. ft. gas, shot, Clinton, T.D. 3,199 ft.

Licking County

Madison Township: Allen Willey et al 1 Louis Jeffers, second quarter, 1,500,000 cu. ft. gas, shot, Clinton, T.D. 2,503 ft.
Ohio Fuel 1 Edward Pigg, Lot 1, second quarter, 370,000 cu. ft. gas, Clinton, T.D. 2,589 ft.
Mary Ann Township: P. Strum Oil Co. 2 Harriett Newlon, fourth quarter, 6 bbl., shot, Berea, T.D. 731 ft.
Union Township: James McCloy 1 Ralph Adams, first quarter, 2-bbl. pumper, shot, Medina, T.D. 2,364 ft.

Meigs County

Salem Township: Ohio Fuel 1 H. L. Ward, Sec. 8, dry, through second Berea, T.D. 1,630 ft.

Medina County

Chatham Township: Preston 15J8 J. F. Grigsby, Tract 15, Lot 10, 5 bbl., Berea, T.D. 539 ft.
Preston J9 J. F. Grigsby, 5 bbl., Berea, T.D. 532 ft.
Preston K8 J. F. Grigsby, dry, Berea, T.D. 515 ft.
Preston 12K8 J. F. Grigsby, 5 bbl., Berea, T.D. 523 ft.
Preston L8 J. F. Grigsby, 5 bbl., Berea, T.D. 519 ft.
Preston L9 J. F. Grigsby, 5 bbl., Berea, T.D. 524 ft.
Preston 14P8 J. F. Grigsby, 5 bbl., Berea, T.D. 526 ft.
Preston CO9 J. F. Grigsby, input, Berea, T.D. 519 ft.
Preston DO7 J. F. Grigsby, input, Berea, T.D. 492 ft.
Preston GO8 J. F. Grigsby, input, Berea, T.D. 491 ft.
Preston XKO8 J. F. Grigsby, input, Berea, T.D. 533 ft.

(Continued on Page 231)

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Shallow Vedder Sand Pool in Dyer Creek District

By L. P. STOCKMAN

LOS ANGELES, Calif., Sept. 15.—Shell Oil Co., Inc., has found some Vedder oil sand in 56-X-11 Smith in the Dyer Creek district of Kern County at 2,361 ft. and discovery of a new field in this area appears quite good. A string of 5½-in. casing has been landed and cemented at 2,325 ft. and preparations are under way for a production test. It is not expected that this well will flow but hopes are high that it will make a good pumping well. A total of 22 ft. of good looking Vedder oil sand has been logged and since many wells in the Mount Poso and Round Mountain are showing good production from 30 to 35 ft. of similar sand it is logical to assume that Shell's new well at Dyer Creek has sufficient sand to result in good production provided an effective water shutoff is made. Dyer Creek is located about 5 miles northwest of the Mount Poso field in Kern County and the trap will be against a fault and quite similar to accumulations at Mount Poso, Round Mountain, Dominion, Coffee Canyon and other similar fields in the eastern part of Kern County.

SUMMARY OF COMPLETIONS

	No.	Bbl.	Footage
Oil wells: San Joaquin Valley	8	4,241	46,238
Coastal district	4	2,269	23,300
Los Angeles Basin	5	1,471	23,077
Dry holes: Fields	2	.....	11,294
Wildcats	2	.....	14,138
Total	21	...	118,047
Recomp.: Coastal district	1	753	.....
Los Angeles Basin	2	382	.....

The present well is the third that Shell has drilled on the Smith property in search of production. All three wells were drilled in 11-26s-27e. The first attempt to find production was 46-11 Smith which found the Vedder barren and was abandoned as a duster at 2,443 ft. Shell's second attempt was 77-11 Smith which likewise found the Vedder barren at 2,424 ft. A small amount of oil sand was cored in this well but it did not offer much encouragement from a production standpoint as it was much too small to test. The most promising thing in connection with Shell's present Dyer Creek wildcat is the fact that the Vedder was found higher structurally than in the two previous wildcats. The bit was still in Vedder oil sand when drilling operations were concluded prior to landing the water string and for this reason the total amount of oil sand may greatly exceed the 22 ft. logged to date. Developments indicate the possibility that Shell's perseverance at Dyer Creek may be rewarded with a discovery of another Vedder sand field. The Vedder sand is the most prolific sand found along the eastern rim of the San Joaquin Valley and it has been found highly productive in the Rio Bravo and Greeley fields. Usually it has excellent porosities and favorable permeability. Shell officials are quite sanguine over the outlook but are reluctant to give the present well too much chance as there is many a slip between an oil sand and oil flowing into the tank. It is safe to say, however, that even if this well fails to result in commercial production the company will drill additional tests in the area as the oil sand is now known to exist and from now on it will be a case of finding the most favorable locations.

SAN JOAQUIN VALLEY COMPLETIONS

Buttonwillow wildcat district, Kern County: Texas 47-15 S.P., 15-29s-24e, abandoned as unproductive, T.D. 12,138 ft., tested hard tight Stevens oil sand of Miocene age but could not develop commercial production.

Southeast Coalinga, Fresno County: R. S. Lytle 62-18-F, 18-20s-16e, flowed 1,741 bbl., 31.5-gravity, 0.1 per cent cut, 1,027,000 cu. ft. gas, 23/64-in. bean, pressures 1,080/1,200 lb., T.D. 7,992 ft., perf. 7,375-7,650 ft., 7,690-7,972 ft., completed in Gatchell zone of Eocene age, green sand 7,356 ft., Gatchell oil sand 7,373-7,980 ft., bottomed in Gatchell silt.

Greeley, Kern County: General Pet. 1 Clarksig, 1-29s-25e, flowed 1,040 bbl., 31.2-gravity, 0.4 per cent cut, 1,240,000 cu. ft. gas, 48/64-in. bean, pressures 400/500 lb., T.D. 11,520 ft., perf. 11,490-11,520 ft., completed in Rio Bravo zone of Miocene age 11,497-11,520 ft., bottomed in Rio Bravo oil sand.

Kettleman North Dome, Kings County: K.N.D.A. 341-2-P, 2-22s-17e, flowed 173 bbl., 50.7-gravity, 8 per cent cut, 6,450,000 cu. ft. gas, 17/64-in. bean, pressures 3,400/3,600 lb., T.D. 10,665 ft., perf. 10,300-10,660 ft., completed in McAdams zone of Eocene age at 10,320-10,665 ft., brown shale 5,420 ft., Temblor 6,715 ft., bottomed in Eocene oil sand.

McKittrick, Kern County: Hoyt, Otis 3 Union, 6-30s-22e, pumped 30 bbl., 15.3-gravity, 1 per cent cut, T.D. 2,361 ft., perf. 2,256-2,361 ft., completed in McKittrick oil sand 2,270-2,361 ft.

Mount Poso, Kern County: Shell 30 Security, 16-27s-28e, pumped 117 bbl., 15.5-gravity, 60 per cent cut, T.D. 1,970 ft., perf. 1,898-1,970 ft., completed in Vedder oil zone of Miocene age 1,900-70 ft.

Texas 13 Alta Vedder, 4-27s-28e, pumped 45 bbl., 16.1-gravity, 10 per cent cut, T.D. 1,820 ft., perf. 1,565-1,685 ft., completed in Vedder oil zone of Miocene age 1,723-1,820 ft.

D. G. Vedder 16 B.N.B., 32-26s-28e, pumped 375 bbl., 15.8-gravity, 0.5 per cent cut, T.D. 1,675 ft., perf. 1,650-75 ft., completed in Vedder oil zone of Miocene age 1,662-75 ft., bottomed in oil sand.

Reef Ridge wildcat district, Kings County: Blair & Co. 1-B Ridge, 24-23s-16e, abandoned as unproductive, T.D. 2,000 ft., abandoned in shale.

Ten Section, Kern County: Shell 33-29-A Kern County Land, 29-30s-26e, flowed 720 bbl., 31.8-gravity, 0.1 per cent cut, 351,000 cu. ft. gas, 20/64-in. bean, pressures 400/600 lb., T.D. 8,235 ft., perf. 8,083-8,223 ft., Stevens oil sand of Miocene age.

Union Avenue wildcat district, Kern County: Hancock Oil Co. 1 Jewett-Watts, 8-30s-28e, abandoned in gray sand at 5,878 ft., top Santa Margarita in interval 5,450-5,550 ft.

Wells in Dominguez West End Going on Pump

The normal and expected decline in pressures in the extreme west end of the Dominguez field where a number of operators have developed edge production is being manifested by smaller production of the flowing wells. To date two wells have been placed on the beam and this tends to indicate the probability that within another several weeks flowing wells will be the exception rather than the rule. The relatively small penetration available in the seventh Callender zone in the west end of the field precludes large production especially in an area where wells are drilled close together. Installation of compressors has not been found highly satisfactory due probably to the low fluid head and preparations are under way to install pumping equipment. Operators are finding it very hard to secure pumping equipment and most of them are shopping around in an effort to secure reconditioned gas and gasoline engines without much success.

Developments in the Inglewood field during the week were marked with the staking of locations for two additional wells on the Vickers lease by Tide Water Associated Oil Co. Hogan Petroleum Co. has completed its second producing well in the Sentous zone of Miocene age in the northern end of the field. No actual gage is available but this well should be on a par with Hogan's initial completion which was a good flowing well. In contrast with this well, Texas Co. is having considerable trouble completing 8 Smith which has been finished at 8,305 ft. with 467 ft. of 5-in. liner including 80-mesh perforations and 8,303 ft. of 2½-in. tubing. This well has failed to result in natural flow and at present is flowing a small amount of oil, gas and water by heads. It is quite probable that Texas will go back into the hole for some additional work unless the well increases production within the next day or so. Failure of 8 Smith to register large production is a distinct disappointment as the first well of Texas Co. in this area, 6 Smith, indicated that a large part of the Smith lease would be found highly productive. Rocky Mountain Drilling Co. spudded in another well on the Vickers lease for Standard Oil Co. and is making good progress.

LOS ANGELES BASIN COMPLETIONS

Dominguez, Los Angeles County: Shell 120 Reyes, 33-3s-13w, flowed 600 bbl., 31.5-gravity, 1.8 per cent cut, 350,000 cu. ft. gas, 38/64-in. bean, pressures 50/500 lb., T.D. 7,932 ft., perf. 7,275-7,442 ft., 7,466-7,542 ft., 7,562-7,602 ft., 7,622-99 ft., 7,719-92 ft., 7,822-7,932 ft., completed in eighth Callender zone of Miocene age.

Huntington Beach, Orange County: Southwest Expl. Co. 41 State, 10-6s-11w, pumped 476 bbl., 24.3-gravity, 0.3 per cent cut, T.D. 5,805 ft., perf. 4,960-5,805 ft., completed in tideland accumulation by directional drilling.

Long Beach, Los Angeles County: Atlantic Oil Co. 23 Signal, 19-4s-12w, pumped 136 bbl., 27.1-gravity, 7 per cent cut, T.D. 7,854 ft., perf. 6,970-7,015 ft., 7,075-7,115 ft., 7,120-65 ft., redrilled from 3,385 ft. and deepened from 5,833 ft.

Union 3 Oil Operators, 13-4s-13w, pumped 246 bbl., 22.3-gravity, 15 per cent cut, T.D. 5,450 ft., perf. 5,140-80 ft., 5,190-5,200 ft., 5,306-55 ft., redrilled and deepened from 4,076 ft.

Wilmington, Los Angeles County: Continental Dev. Corp. 22 Harbor, 2-5s-13w, pumped 165 bbl., 14.5-gravity, 2 per cent cut, T.D. 3,332 ft., perf. 3,020-3,325 ft., completed in Ranger zone of Pliocene age.

Zephyr Oil Co. 1 Banning, 29-4s-13w, pumped 150 bbl., 15.1-gravity, 20 per cent cut, T.D. 6,761 ft., redrilled 3,405 ft., perf. 3,197-3,405 ft., this well originally Tide Water Associated Oil Co. 1 Banning drilled to basement complex at 6,741 ft. and later abandoned. Zephyr took over well and redrilled from 3,232 ft. to 3,405 ft., completed in Ranger zone of Pliocene age.

J. F. Wilcox 1 Timberlake, 20-4s-13w, pumped 80 bbl., 15.5-gravity, 50 per cent cut, T.D. 3,603 ft., perf. 3,433-3,602 ft., completed in equivalent of Ranger zone of Pliocene age.

Permit Granted for San Fernando Test

Shell Oil Co., Inc., has been granted a permit to drill a wildcat on 347 acres of rolling hills in the mountainous area northwest of the San Fernando reservoir and about 1 mile west of San Fernando Road in the San Fernando section of Los Angeles County. This permit covers acreage in 6-2n-15w, about 3 miles southeast of the Aliso Canyon field which was discovered a few years ago by Tide Water Associated Oil Co. The reservoir section has been under inspection for more than a year due to the location of oil and gas seeps in the area and found in the drilling of several shallow water wells. These water wells were drilled by the Los Angeles Metropolitan Water Department and others to increase the supply of water to maintain the supply of water in the reservoir. Heretofore operators have been unable to secure permits to drill due to zoning laws which are always hard to set aside. This area contains a structure which appears to be an anticline although it will take the drilling of a well to determine its potentiality from a production standpoint. This is considered an excellent location for a wildcat as the area has considerable merit and has been reported on favorably by several consulting geologists. The last group of operators who were looking at the area would have accepted the area if sufficient acreage could have been blocked up.

More Deep Tests to Be Drilled in Ventura Avenue

The recent completion of Lloyd Corp. 8 in the east end of the Ventura Avenue field as a good flowing well at 11,153 ft. has stimulated interest in deep production to the east and several deep wells will be drilled in that area in the immediate future. As had been expected, Shell Oil Co., Inc., is preparing to reenter and redrill and deepen its 1-A Shell-Lloyd which was finished as a small producer at 9,582 ft. This well was not carried deep enough to encounter the deep pay but it should prove to be a good well upon being deepened. The development of deep production in the Ventura Avenue field of Ventura County can be attributed to the strong belief of Ralph Lloyd who has always held that the east end of the Ventura Avenue field should yield large production in the lower zones. He has drilled several deep wells and has proved beyond a doubt that his belief has been well founded. Before Ralph Lloyd began drilling his own wells, Tide Water Associated Oil Co. drilled a well in conjunction with Lloyd but only got a very small well above 9,500 ft. Then Shell Oil Co., Inc., drilled a well for Lloyd but it too stopped short of the deeper zones. Lloyd Corp. has completed several deep wells in the eastern end of the field and Lloyd 8, the recent completion, is the deepest well drilled in the Ventura Avenue field up to the present time. This well was drilled for Ralph B. Lloyd by Drilling & Exploration Co., the Brantley interests.

Cat Canyon Test Running High

The most important development in the Santa Maria district during the past week is the announcement

(Continued on Page 242)

Ohio Fields

(Continued from Page 229)

Preston 1O6 J. F. Grigsby, input, Berea, T.D. 535 ft.
Preston LO7 J. F. Grigsby, input, Berea, T.D. 517 ft.

Monroe County

Center Township: Frank Ward 1 C. Ketterer, Sec. 1, 90,000 cu. ft. gas and 1 bbl., lime and Keener, T.D. 1,410 ft.

Morgan County

Marion Township: Williams et al 1 Letitia Green, Sec. 4, 400,000 cu. ft. gas, Brill, T.D. 915 ft.
W. S. Harris 1 G. Starling, Sec. 13, 400,000 cu. ft. gas, Maxon, T.D. 833 ft.
Williams et al 1 L. Geddes, Sec. 12, 1 bbl., shot, Fossil sand, T.D. 378 ft.
York Township: Ohio Fuel 1 Toy E. Divers, Sec. 23, dry, Clinton and Medina, T.D. 4,355 ft.

Muskingum County

Brush Creek Township: Industrial Gas Corp. 1 E. R. Meyer, Sec. 15, 1,330,000 cu. ft. gas, Clinton, T.D. 4,158 ft.
Harrison Township: Industrial Gas Corp. 1 E. F. Bayce, Sec. 2, 180,000 cu. ft. gas, shot, Clinton, T.D. 4,287 ft.
Newton Township: Atha Oil Co. 1 Alva Maddon, NE Sec. 14, 390,000 cu. ft. gas, Clinton sand, T.D. 3,385 ft., also small oil show.

Noble County

Noble Township: F. W. Fassett 4 Nelson Leasure, NW Sec. 34, about ¼-bbl. pumper, Macksburg 300-ft. sand, T.D. 215 ft.
Harper & Sons 6 A. J. Everly, Sec. 27, dry, M-700 sand, T.D. 635 ft.

Tuscarawas County

Sandy Township: Natural Gas W. Va. 2 William Ho'shoy, Sec. 8, 1,200,000 cu. ft. gas, shot, Clinton, T.D. 4,881 ft.

Washington County

Aurelius Township: Peaker et al 7 Isaac Delong, Sec. 17, dry, Buel Run sand, T.D. 201 ft.
Phillips & Co. 1 W. M. Sherbourne, NW Sec. 18, dry, Peeker sand, T.D. 625 ft.
Barlow Township: Albert H. Jahn et al 3 E. L. Benson, Lot 720 at Fleming, 400,000 cu. ft. gas, Injun sand, T.D. 1,485 ft.
Ohio Fuel 3 H. J. Fresch, Sec. 10, 20,000 cu. ft. gas, shot, Berea, T.D. 1,890 ft.; (old gas well deepened).
Liberty Township: Otto Heldman 3 George Schlarb, Sec. 20, 220,000 cu. ft. gas, stray, T.D. 1,180 ft.

Wayne County

Sugar Creek Township: Ohio Fuel 1 Ivan Gerber, Sec. 14, 200,000 cu. ft. gas, T.D. 837 ft.

INDIANA COMPLETIONS

Wildcats

Daviess County: R. D. Brown, Inc., 1 Chapman, SW SW SW 15-2n-6w, 350,000 cu. ft. gas, pay 676-83 ft., Golconda 585 ft., T.D. 683 ft.
Starke County: A. A. Douglas 1 Oeding, NE SW NE 18-34n-2w, location abandoned.

Fields

Bufkin South, Posey County: Central States 2 Breeze, W½ SW SW SW 19-6s-12w, pumped 25 bbl., sand 1,102-25 ft., T.D. 1,125 ft.
Central States 2 Seifert, NE NW NW 30-6s-12w, pumped 70 bbl., sand 1,082-1,103 ft., T.D. 1,103 ft.
Griffin, Gibson County: Hall-Edwards 38 Maier, NW SE NW 14-3s-14w, swabbed and flowed 270 bbl., 50-qt. shot 2,509-40 ft., T.D. 2,540 ft.
Heusler, Vanderburg County: T. W. Drake 2 Nurrenbern, SW NW NW 5-7s-11w, pumped 8 bbl., 100-qt. shot 1,107-46 ft., T.D. 1,148 ft.

EASTERN KENTUCKY

ASHLAND, Ky., Sept. 15.—Eastern Kentucky's gas well production was increased by a combined open flow of 6,633,000 cu. ft. of gas this week as completion data were received from 18 wells in the area.

Floyd County

Warfield 5025 Elkhorn Coal Corp., Parsons Branch, 989,000 cu. ft. gas, shale, 3,223 ft.
John Allen 1 Setzer heirs, Toms Creek, 337,000 cu. ft. gas, shale, 2,564 ft.
Kentucky-West Virginia 631 Lillie A. Runyon, 67,000 cu. ft. gas, shale, R.P. 405 lb. at 2,965 ft.
Kentucky-West Virginia 636 Edmond Clar, 211,000 cu. ft. gas, shale, R.P. 425 lb. at 2,730 ft.
Kentucky-West Virginia 637 Alex Martin, 353,000 cu. ft. gas from shale and Big lime, R.P. 435 lb. at 2,911 ft.

Pike County

Columbian 856 Rogers Brothers Coal Co., Turkey Creek, 84,000 cu. ft. gas, shale, 3,802 ft.
United Carbon 943 Rex C. Justice, Levisa Fork, 1,565,000 cu. ft. gas, shale, 3,516 ft.
United Carbon 953 Mary E. Adkins, Hopkins Creek, 240,000 cu. ft. gas, shale and upper formations at 3,666 ft.
United Carbon 951 Colony C. & C., Buckhorn Branch, 119,000 cu. ft. gas, shale, at 3,264 ft.
Kentucky-West Virginia 618 T. B. Blackburn, John's Creek, 386,000 cu. ft. gas from shale, R.P. 325 lb. and 105,000 cu. ft. from Big lime, R.P. 435 lb. at 2,773 ft.
Kentucky-West Virginia 5331 J. W. Vicars, McComb Branch, 61,000 cu. ft. gas, R.P. 332 lb. at 2,915 ft.
Kentucky-West Virginia 5335 Mary Compton, Long Branch of Island Creek, 660,000 cu. ft. gas, R.P. 550 lb. at 1,702 ft.

Martin County

Southeastern 793 E. D. Wiles, Chaffin Branch, 989,000 cu. ft. gas, shale at 2,687 ft.
Rockcastle Gas Co. 1 Joel Justice, Rockcastle Creek, 47,000 cu. ft. gas, shale at 2,675 ft.
Williams & Fowler, 1 Dempsey heirs, Tug Fork, 158,000 cu. ft. gas, shale, at 2,643 ft.

Knott County

Kentucky-West Virginia 5325 J. M. Gibson, Jones Fork 82,000 cu. ft. gas, shale, R.P. 175 lb. at 2,684 ft

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PICTURES No. 1—Cutting a 36" ditch in Louisiana; No. 2—Laying 18" line through Louisiana swamps; No. 3—8" river crossing in Oklahoma; No. 4—Electric welding 18" pipe in Mississippi; No. 5—10" sidebend in Kansas (average of 8,000 feet daily); No. 6—Reconditioning old 12" Teapot Dome line in Nebraska to be re-laid.

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Chapel Hill Outpost Preparing For Two-Sand Completion

By D. H. STORMONT

DALLAS, Tex., Sept. 15.—Operators at the Texas Co. 1 G. R. Phillips, Hanks Survey, Smith County, were making preparations at the end of the week to start completion operations. Based on the results of a drill-stem test, 1 Phillips will add additional oil-pay territory to the north-northeast flank of the Chapel Hill field.

When tested on drill stem through casing perforations at 8,100-30 ft., the well showed gas in 50 minutes, then mud and wash water and in 5 hours, oil. Operators allowed the flow to continue for 6 hours and noted an increase in oil, however, no estimate was made on the output. At the end of the 6-hour flow period the tool was closed and pulled, recovering 2,000 ft. of oil and 700 ft. of gas-cut mud.

No. 1 Phillips is the most northerly producer from the Pettit lime and will be completed as a dual operation, making gas-distillate from the Paluxy zone. The possibility of production from the Paluxy was indicated on a test through perforations from 5,790 to 5,830 ft.

Marked increase in Field And Wildcat Operations

Three new locations in the Long Lake field of Anderson County indicate a renewal of activity in that field, while in the same county the Cayuga field was given one new location and two oil completions. The new two-well Pleasant Grove pool of Rusk County, which recently suffered a setback because of a peculiar faulted structure, will soon see more action. Applications were filed for four drilling permits, three of them to L. O. McMillan, owner of the discovery well. He will drill 1-B Evans in the northwest corner of a 60-acre tract; 1 Achby, southeast corner of a 20-acre tract, and 1 Weatherby, southwest corner of a 47-acre tract, all in the May Survey. The fourth permit was issued to Ross Sears and A. Thrash for 1 Evans, on a 15.11-acre tract, May Survey.

Wildcat locations were reported staked in Red River, Robertson, Wood and Smith counties. The Red River County will be drilled by Magnolia Petroleum Co. at 1 J. N. Henry, 640 ft. from the west and 700 ft. from the north lines of a 100-acre tract in the M.E.P.&P. Survey 103, on a 20,000-acre block falling in both Red River and Lamar counties. The test is expected to go to 6,500 ft. or deeper and will investigate the lower zones, including the Smackover lime.

Two Woodbine sand tests are planned for Robertson County. Derrick is up at the Heith & Morrison 1 Martin, in the northwest corner of a 225-acre tract in the Cox Survey, ½ mile northwest of Easterly. The Woodbine is expected around 4,000 ft.

Another 4,000-ft. test to be drilled soon is the Bobby Manziel and F. Morrison 1 Stephens in the northwest corner of a 50-acre tract in the J. Hill Survey, on a block of 10,000 acres. Thought to be on the Easterly dome, the wildcat will seek production from the Woodbine sand.

EASTERN TEXAS COMPLETIONS

Wildcats

Upshur County: W. W. Bradley 1 Robinson, J. Sanders Sur., 1½ mi. NE Big Sandy, top Austin 4,039 ft., Woodbine 4,320 ft. (water), dry at 4,636 ft.

Geo. Sutton 1 Gorman, S. G. Slayton Sur., 1 mi. SW Big Sandy, top Woodbine 4,850 ft., dry at 4,930 ft.

East Texas Field

(1-hour gage)

Longview, Gregg County: Atlantic 13 Fisher, W. G. Castleberry Sur., 80 bbl., perf. casing 3,490-98 ft., T.D. 3,545 ft.

Magnolia 12 Beavers, G. R. Rains Sur., 90 bbl., 3,537-52 ft.

Selby Oil & Gas D-17 Snavely, W. Tyndale Sur., 44 bbl., 3,555-64 ft.

Stanolind 14 Smith, W. Robinson Sur., 47 bbl., 3,531-45 ft.

Kilgore, Gregg County: W. R. Newnham 2 Lloyd, W. V. Winkle Sur., 12 bbl., 3,562-77 ft.

Roosth & Genecov 4 Presbyterian Church, 12 bbl., 3,542-59 ft.

Wheelock & Collins 14 Clayton, L. B. Outlaw Sur., 40 bbl., 3,523-35 ft.

Joiner, Rusk County: Royal Pet. 7 Pinkston, M. V. Pena Sur., 3 bbl., pumping, 3,557-80 ft.

Stanolind & Pure 74 Siler, M. Walker Sur., 26 bbl., 3,622-60 ft.

Other Fields

Cayuga, Anderson County: Tide Water-Seaboard 8 Lutterloh, J. Wilson Sur., 182 bbl. in 24 hr., ⅛-in. choke, T.D. 4,037 ft.

Tide Water-Seaboard 1 Robertson, T. Bristow Sur., 109 bbl. in 24 hr., 5/32-in. choke, T.D. 4,100 ft.

Hawkins, Wood County: O. D. Alsobrook & Fred Bridsong 1 Cobb, Brewer Sur., 120 bbl. in 6 hr., ¼-in. choke, top Austin 4,145 ft., Woodbine 4,417 ft., oil sand 4,503 ft., T.D. 4,770 ft.

Hollandsworth Drlg. 1 Prince, E. Wideman Sur., top Austin 4,288 ft., Woodbine 4,624 ft., dry at 4,888 ft.

Humble 1 Jeffery, Brewer Sur., 114 bbl. in 6 hr., ¼-in. choke, top Woodbine 4,378 ft., oil sand 4,512 ft., T.D. 4,854 ft.

Humble A-1 Slaughter, Brewer Sur., 99 bbl. in 6 hr., ¼-in. choke, top Woodbine 4,532 ft., perf. casing 4,666-72 ft., T.D. 4,820 ft.

Humble C-1 Smith, Brewer Sur., 163 bbl. in 18 hr., ¼-in. choke, top Woodbine 4,268 ft., oil sand 4,475 ft., T.D. 4,821 ft.

Humble 1 Surratt, J. Pollock Sur., 259 bbl. in 24 hr., ¼-in. choke, Woodbine 4,573 ft., oil sand 4,638 ft., T.D. 4,835 ft.

Humble 3 T.&P. R.R., Brewer Sur., 107 bbl. in 6 hr., ¼-in. choke, top Woodbine 4,404 ft., perf. casing 4,779-84 ft., T.D. 4,840 ft.

Roger Lacy 1 Price, Brewer Sur., 110 bbl. in 6 hr., ¼-in. choke, T.D. 4,823 ft.

C. H. Lyons 1 Ervin, H. F. Robinson Sur., 58 bbl. in 6 hr., ¼-in. choke, top Woodbine 4,560 ft., T.D. 4,852 ft.

Navarro Oil 3 Mayberry, J. P. Moseley Sur., 82 bbl. in 6 hr., ¼-in. choke, top Woodbine 4,317 ft., oil sand 4,434 ft., T.D. 4,768 ft.

O. F. Wencker 1 Slaughter, Brewer Sur., 345 bbl. in 18 hr., ¼-in. choke, T.D. 4,821 ft.

Talco, Franklin County: Humble 13 Dawson, I. Pennington Sur., 58 bbl. in 3 hr., pumping, T.D. 4,301 ft.

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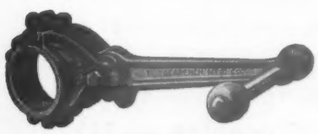

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OKLAHOMA FIELD REPORT

Guthrie Townsite Wildcat Checks High on Viola

By ROBERT INGRAM

POSSIBILITY of a new Wilcox sand field on the south edge of the Guthrie townsite, about 6 miles southwest of the new Guthrie pool, set off trading last week around Harry A. Miller 1 Katscher, N½ NE SW 7-16-2w, a wildcat. Oil men took an interest in the property when the well topped the Viola lime at 5,505 ft., 193 ft. higher than it was found in Shell Oil Co., Inc. 1 Hirzel, a high but dry hole on the west edge of the townsite.

Hunton lime was topped at 5,380 ft. and the Sylvan shale at 5,413 ft. Early this week crews were attempting to restore circulation which was lost after they took a 5-ft. core from the Simpson dolomite at 5,655 ft. The Mississippi and the Woodford sections were not present, it was reported, and this condition attracted the first attention. Real interest developed, however, when the Sylvan was topped.

The Guthrie area generally was active. At the Guthrie pool itself, Sunray Oil et al were preparing to swab and test 1 McLeod, NE NE SE 12-17-2w, a west edge test. The 1 McLeod had water in the Wilcox, but was plugged back and casing was ripped at 5,060-70 ft. and 5,109-23 ft. in the Bartlesville sand to show for a producer.

In the proven area of the pool, Sunray et al 6 Donoghue, SW NE SE 7-17-1w, was drilling below 5,350 ft.; Sinclair Prairie 3 Sult, SW SE NE 7-17-1w, was drilling below 1,960 ft., and Continental 1 Metzger, SE SE NE 12-17-2w, was drilling at 3,515 ft.

Bryan County Wildcat Tops Simpson Abnormally High

Sinclair Prairie Oil Co. at its wildcat in Bryan County has discovered what may well add another chapter to the study of geological conditions in southern Oklahoma.

Sinclair 1 Erwin, SW SE 18-6s-12e, near Bennington, topped the Simpson series at 805 ft. indicating either a buried mountain of Wichita-Arbuckle type, an extension of the Arbuckle uplift or merely a folded condition.

There was some opinion that the discovery, announcement of which caused much excitement in geologic circles Thursday night, may indicate that basement rocks appear closer to the surface than earlier imagined, while others said that it may merely indicate a considerably thick section of the Simpson series.

Most believe, however, that the finding of the Simpson so high will probably condemn the area on which Sinclair has assembled a 20,000-acre block.

The wildcat was drilling ahead below 1,077 ft. at last report.

Blowout Marks Third Gas Show in Garvin County Test

Ohio Oil Co. apparently had opened a gas field last week at 1 Freeman, SE SE SE 14-1n-1w, southwest of Wynnewood in Garvin County, on a 2,000-acre block of leases.

Third gas show was encountered while drilling at 1,630 ft. and the hole was cleaned by an estimated 5,000,000 cu. ft. of gas. Mud was blown over top of the derrick, and the flow was not killed until several hours later. Crews loaded the hole and were to drill ahead.

First gas show at 985 ft. blew mud out of the hole while crews were drilling pipe; the second was at 1,100 ft. where the gas heaved for several hours before being killed with baroid.

OKLAHOMA COMPLETIONS

Wildcats

Creek County: Zephyr 1 Irelan-A, NE SE NW 3-16-8, dry, T.D. 2,827 ft., Red Fork 2,785-2,825 ft.

Jones 1 Jennings, NW SE NE 18-16-8, dry, T.D. 3,726 ft., Misener 3,582 ft.

Payne County: Tomlinson 1 Williams, NE SE NW 4-19-2, dry, T.D. 4,955 ft., first Wilcox 4,886 ft., second Wilcox 4,944-55 ft.

Pottawatomie County: Halsey 1 Brandenburg, NW SE 23-7-3, dry, T.D. 4,817 ft., Wilcox 4,801 ft.

Seminole County: Papoose 1 Tiger, NE SE 14-9-7, dry, T.D. 3,398 ft., Cromwell 3,385 ft., some show oil. Delaney 1 Jonah, SE NE 25-8-6, dry, T.D. 4,300 ft., Wilcox 4,300 ft.

Fields

Allen, Pontotoc County: Sunray 11 Shields, SE NW NE 33-5-8, pumped 20 bbl., sand 665-81 ft., shot, T.D. 681 ft.

Altus, Jackson County: Aloma 1-A Robertson, NE NE SE 15-1-20w, pumped 21 bbl., 7-in. 1,363 ft., T.D. 1,601 ft.

Avoca, Pottawatomie County: Atlantic 2 Goss, SW NW SE 6-6-4, pumped 326 bbl. oil and 82 bbl. water, Wilcox 4,518-26 ft., 5-in. 4,511 ft., T.D. 4,526 ft.

East Bebee, Pontotoc County: Culver & Shepherd 1 Raper, NW NW NE 16-5-5, pumped 40 bbl., Hunton 2,200 ft., 7-in. 2,203 ft., T.D. 2,451 ft.

North Bebee, Pottawatomie County: Garr 3 Walker, NE SW SE 9-5-5, pumped 250 bbl., Hunton 2,255 ft., Sylvan 2,474 ft., 7-in. 2,245 ft., T.D. 2,481 ft.

Northeast Bethel, Seminole County: Winona 1 Hawkins, SW SE SE 24-10-7, 3,000,000 cu. ft. gas, show oil 3,576-77 ft., Cromwell 3,556 ft., sand 3,577-96 ft., perf. 3,554-70 ft., T.D. 3,596 ft.

North Bristow, Creek County: Marrs 1 Turner, NW SW SW 16-17-8, pumped 35 bbl. oil and 15 b. water, Prue 2,330-45 ft., 6-in. 2,285 ft., shot, T.D. 2,345 ft.

Cement, Caddo County: Magnolia 8 Surbeck, SE S. 3-5-9, old well drilled deeper from 3,755 ft., sand 4,031-39 ft., T.D. 3,805 ft., pumped 35 bbl.

Cushing, Creek County: Mid-Continent 31 Stewart, N½ SW SW 15-7-7, pumped 3 bbl. oil and 1 bbl. water, Bartlesville 2,764-2,831 ft., 7-in. 2,770 ft., shot, T.D. 2,836 ft.

Dilworth, Kay County: McKnabb 1 Warren, SE NW 19-28-1, flowed 27 bbl., Wilcox 3,336-52 ft., shot, 5-in. 3,336 ft., T.D. 3,352 ft.

(Continued on Page 236)

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GAUGES

TEXAS GULF COAST

Needville Test Has Distillate In Marginulina and Frio

By NEIL WILLIAMS

HOUSTON, Tex., Sept. 15.—In the Needville area, Fort Bend County, W. L. Goldston 1 E. M. Coyle showed promise of gas-distillate production in the Marginulina and Frio sands. The Discorbis was topped at 4,771 ft., Heterostegina at 4,884 ft., round Marginulina at 4,914 ft., and a 5½-minute drill-stem test at 4,985-5,023 ft., tested 375 lb. working pressure and recovered 30 ft. of mud cut with distillate. The well was cored ahead, topping the Frio sand at 5,051 ft., and another 5½-minute drill-stem test at 5,170-80 ft., tested 450 lb. working pressure, and 10 ft. of mud with an oil odor was recovered. Drilling continues below 5,460 ft., and the well is expected to be drilled to the Vicksburg formation. This area has been looked upon as a favorable prospect for a number of years, and a number of wells have been drilled, but no commercial production was developed. The well is in the H.&T.C. Survey 39, just south of the town of Needville.

Wilcox Trend Play

Along the Wilcox trend, Glenn McCarthy 1 Roscoe Sayle, Montgomery County, continues to drill ahead in shale below 8,987 ft., and sand with a slight oil odor was logged at intervals from 8,668-78 ft. The well established itself as a probable pool opener the previous week when a drill-stem test in the upper Wilcox at 8,448-74 ft., tested 475 lb. working pressure and several hundred feet of distillate-cut mud. Location is in the J. Scott Survey about 1 mile southwest of the town of Magnolia. In the meantime, Continental 1 Foster estate, east of the town of Willis, was abandoned in the Wilcox at 10,570 ft., the top of the section having been topped at 7,410 ft. In the eastern part of the county, Atlantic 1 Foster Lumber Co., is shut down at a total depth of 9,942 ft., where the drill stem was twisted off.

On the south side of the Segno field, Polk County, Gulf 48 Wing, which is attempting to open production from the lower Wilcox, is shut down for orders after tubing became stuck in the cement retainer following a cement squeeze job at 10,500-08 ft. The hole was plugged back to test another sand section following a production test at 11,270 ft. which tested salt water.

Martha Extended

The Martha field, Liberty County, was extended on the south side as Stanolind 6-A Seaberg was flowing pipe-line oil while testing in the discovery pay at 8,205-15 ft. Tubing pressure was 700 lb. and casing pressure 525 lb.

Location for an interesting semiwildcat test was announced by John Blaffer 1 O. C. Bailey to be drilled about ½ mile north of the Conroe field, Montgomery County. Location is in the Kuykendall Survey, and the well is projected to the Cockfield sand at 5,000 ft.

Additional development was assured the Chocolate Bayou field, Brazoria County, by the completion of a large gas-distillate producer 1 mile northwest of production. The extension was made by the completion of Glenn McCarthy 1 Triangle Development, which flowed 113 bbl. of distillate in 10 hours through a ¼-in. choke. Total depth of the well is 11,209 ft., and production is through perforated casing opposite the basal Frio sand at 9,658-80 ft. The well was drilled on a farmout lease from Gulf Oil Corp., which is offset by leases held by Phillips Petroleum Co. and Stanolind Oil & Gas Co.

TEXAS GULF COAST COMPLETIONS

Wildcats

Hardin County: Republic 1 Gus Hooks, dry, T.D. 7,070 ft.

Jackson County: Rowan & Hope 1 Milby, dry, T.D. 6,512 ft.

Liberty County: Glenn McCarthy 1 Pickett, top Marginulina 6,386 ft., Frio 6,583 ft., dry, T.D. 8,620 ft.

Montgomery County: Continental 1 Foster estate, top Weches 6,805 ft., Queen City 6,930 ft., Wilcox 7,410 ft., dry, T.D. 10,576 ft.

Hill & Hill 1 Crawford, top Cockfield 3,698 ft., dry, T.D. 3,800 ft.

Fields

Fannett, Jefferson County: Gulf 1 Bell, dry, T.D. 8,546 ft.

Lolita, Jackson County: Magnolia 24 Mitchell, 4 bbl., 12 hr., ⅞-in. choke, perf. casing 5,820-32 ft., T.D. 6,462 ft.

Shield-Rutherford 2 Mitchell, 99 bbl., ⅛-in. choke, perf. casing 5,263-95 ft., T.D. 5,297 ft.

Maurbro, Jackson County: Humble 2 Drushel, 477 bbl., ¼-in. choke, sand 5,218-32 ft.

North Markham, Matagorda County: Ohio 8 J. C. Carlson, 174 bbl., ⅛-in. choke, perf. casing 7,714-24 ft., T.D. 8,091 ft.

Ohio 9 Carlson, 197 bbl., ⅛-in. choke, perf. casing 7,716-20 ft., ⅛-in. choke, T.D. 7,971 ft.

Sun 3 Braman, 87 bbl., ¼-in. choke, perf. casing 8,040-60 ft., T.D. 8,101 ft.

Old Ocean, Brazoria County: Harrison & Abercrombie 1 Mueller, 405 bbl., ¼-in. choke, T.D. 10,980 ft.

Shell 1 Smith, 168 bbl., ¼-in. choke, T.D. 10,807 ft., P.B., T.D. 10,696 ft.

Texana, Jackson County: Sinclair Prairie 1 Volkner, 80 bbl. oil and 72 bbl. salt water, 9/64-in. choke, perf. casing 5,102-06 ft., T.D. 5,780 ft.

Tomball, Harris County: Humble 26 Reid, 215 bbl., ¼-in. choke, top sand 5,562 ft., T.D. 5,586 ft.

Van Vleck, Matagorda County: Skelly 24-A Cobb, 145 bbl., 7/64-in. choke, perf. casing 8,494-8,500 ft., T.D. 8,511 ft.

West Columbia, Brazoria County: Texas 42 Abrams, 270 bbl., ¼-in. choke, perf. casing 5,680-96 ft., 5,704-16 ft., T.D. 5,728 ft.

Texas 27 Arnold, dry, T.D. 3,242 ft.

West Ranch, Jackson County: Lewis Crouch 2-L Ranch, 34 bbl., 3 hr., ⅛-in. choke, perf. casing 5,432-37 ft., T.D. 5,579 ft.

Magnolia 163-A West Ranch, 185 bbl., 9/64-in. choke, perf. casing 5,735-45 ft., T.D. 5,746 ft.

Magnolia 189-A West Ranch, 121 bbl., 9/64-in. choke, perf. casing 6,139-44 ft., T.D. 6,145 ft.

Willow Slough, Chambers County: Sun 1 C. L. Wakefield, 13,800,000 cu. ft. gas, open tubing, T.D. 8,792 ft., P.B. T.D. 8,750 ft.

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Large Area Opened for Drilling By Larto Lake Discovery

By R. MARNE SANFORD

SHREVEPORT, La., Sept. 15.—The new Wilcox sand oil discovery marking the first commercial production for Catahoula Parish was officially gaged the past week for one of the best producers in the district. Indicating the opening of a new Austin chalk lime field in De Soto Parish, a wildcat which has been shut down for several months, was opened to make several flows of clean 42-gravity oil.

Just north of Larto Lake in southern Catahoula Parish, Carter Oil and Phillips Petroleum have officially gaged 1-B Tensas Delta Land Co., C NE SE 14-5n-5e. The well gaged 154 bbl. of 46-gravity oil daily, flowing, through perforations in the 7-in. casing from 5,112-17 ft. with 20 shots. Only 8 per cent of the total fluid output was water. The flow was under tubing pressure of 175 lb. and casing pressure of 500 lb. With an elevation of 49 ft., the new field discovery topped the Cockfield at 2,229 ft., Sparta 2,983 ft., Cane River 3,695 ft., Wilcox at 3,938 ft., and logged oil sand from 5,110-32 ft. The 10¾-in. casing is set at 612 ft. and the 7-in. is at 5,504 ft., total depth 6,000 ft.

Immediate drilling is expected for the area surrounding the new discovery and especially to the northwest toward the recent Walters field discovery. It is believed that before many months La Salle Parish and the southern part of Catahoula Parish will be the scene of most activity in the state in regards proven-field development. Much of the acreage along the Olla, Little Creek, Nebo, Hemphill, and Larto Lake trend is expected to be proven for oil development and this will mean that much drilling will be carried on over the water of the large Catahoula Lake. Best means of drilling over water in this low-land country are already being discussed. Much of Catahoula Lake, the beds of five large rivers that converge nearby, and also Larto Lake further south, are expected to be within proven territory. The State of Louisiana has already asked for bids on land under Catahoula Lake and some drilling here is foreseen for the near future.

Completions Reach New High

Completions in the North Louisiana and Arkansas fields reached a new high the past week with a total of 27 being reported in North Louisiana and 5 in Arkansas for a grand total of 32. Of this number four were oil wells in Arkansas and one was a condensate producer. In North Louisiana 19 were oil wells in proven fields, 1 was an oil discovery in wildcat area, 4 were dry holes in proven fields, 2 were gas wells in proven fields, and 1 was a wildcat failure.

De Soto Parish Wildcat Indicates Discovery

The Grand Cane area of De Soto Parish, 30 miles south of Shreveport, drew considerable attention the past week as a wildcat which had been shut down for several months, was opened to flow free oil after acidization. It is J. E. Stack and Providence Drilling Co. 1 L. M. Cook, NW NE 32-13-14. Having been drilled to the top of the pay at 2,816 ft. last November at which time it was shut down for acreage acquisitions in the area, the test was opened, acidized with 3,000 gal., and responded with a flow filling a 125-bbl. storage tank in a few hours. Subsequent testing has proved the well not up to its initial performance, however. In a 36-hour period at the close of the week the well swabbed and flowed a total of 50 bbl. It is believed that the hole has bridged and further testing is under way. The oil has been identified as about 42 gravity.

Wilcox Wildcats Located

There were four new Wilcox sand wildcat tests located the past week, all in the Central Louisiana active area. In Catahoula Parish H. L. Hunt staked 21-F Goodpine, NW SW 9-10n-5e, in the extreme northwestern corner of the parish.

Two tests were located in Concordia Parish and east of the most active exploratory area. Harry W. Elliott 1 Brown is in NE SW 33-8n-8e, and J. K. Hughes Oil 1 Merrill is in C E½ SW 23-7n-9e.

In Grant Parish H. L. Hunt has staked 6-F Goodpine, SE NW 29-9n-1e, about 7 miles west of produc-

SUMMARY OF COMPLETIONS

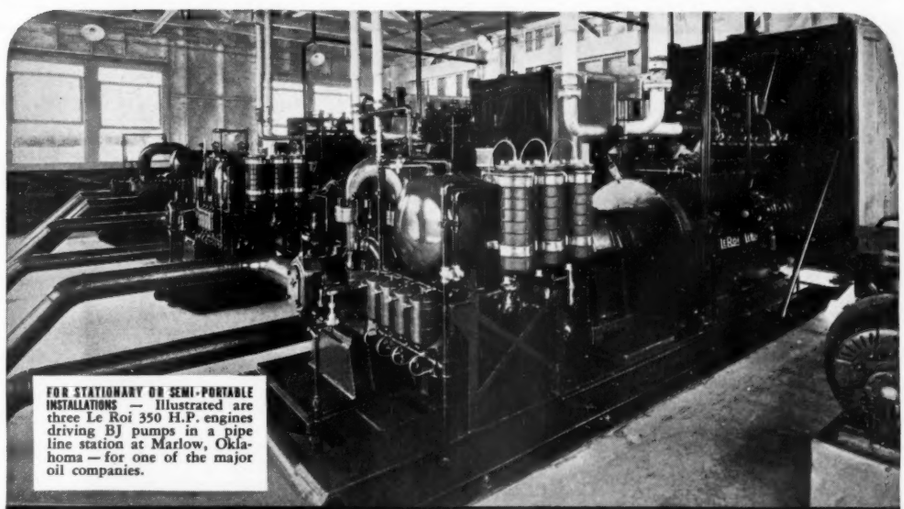
North Louisiana

	No.	Bbl.	Footage
Oil wells: Wildcats	1	154	6,000
Fields	19	2,213	66,941
Gas wells: Monroe	2	*10	7,958
Dry holes: Wildcats	1		5,460
Fields	4		19,830
Total	27		100,729

Arkansas

	No.	Bbl.	Footage
Oil wells Fouke	1	45	3,710
Troy	1	22	2,101
Smackover	1	90	2,738
Gas wells: Dorcheat	1	†271	8,880
Total	4		17,429

*Million cu. ft. †Bbl. condensate.



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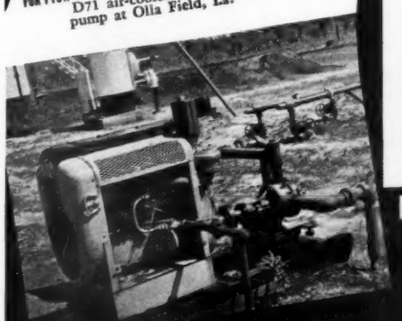

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tion in the Little Creek field of La Salle Parish.

NORTH LOUISIANA COMPLETIONS

Wildcats, Catahoula Parish: Carter and Phillips 1-B Tensas Delta Land Co., C NE SE 14-5n-5e, 10¾-in. 612 ft., 7-in. 5,504 ft., perf. 5,112-17 ft. with 20 shots, flowed 154 bbl. oil with 8 per cent water, 46 gravity, T.D. 6,000 ft., C.P. 500 lb., T.P. 175 lb.

La Salle Parish: H. L. Hunt 19-F Goodpine, NE SW 36-9n-4e, dry at 5,460 ft.

Ajax, Natchitoches Parish: J. E. Waits 2 Tanner estate, SW NW 18-10n-10w, T.D. 3,223 ft., perf. casing 3,207-17 ft., flowed 5 bbl. oil and 400 bbl. water.

Bellevue, Bossier Parish: Premier Investment 59 Wyche, SE NW 14-19n-11w, 25 bbl. oil and 50 bbl. water, T.D. 397 ft.

Premier Investment 54 Wyche, SE NW 14-19n-11w 10 bbl. oil, T.D. 396 ft.

Premier Investment 57 Wyche, NW SE 14-19n-11w 10 bbl. oil, T.D. 405 ft.

Caddo, Caddo Parish: Davis & Hart 4-A Muslow, SW NE 5-20n-15w, 35 bbl., 1,503 ft.

J. E. Marshall 1-A Spell, NW SE 29-21n-15w, 35 bbl. oil, 1,554 ft.

Stanolind 139 Dillon heirs, NW SE SE 14-21n-15w 90 bbl. oil, 23 bbl. water, 1,620 ft.

Cotton Valley, Webster Parish: Hunt 1-A Grigsby, N½ SW 17-21n-9w, 138 bbl. oil and 41 bbl. water, 8,694-8,700 ft. in Bodcaw sand.

Little Creek, La Salle Parish: Placid Oil 1 Cockerham, NE SW 32-9n-2e, 179 bbl. oil with 6 per cent water, perf. casing 2,386-96 ft., T.D. 2,690 ft.

Monroe, Union Parish: Nemours Corp. 4 Edwards, NE NW 11-21n-3e, 976,000,000 cu. ft. gas, 2,182 ft.

Nebo, La Salle Parish: H. L. Hunt 5-C Goodpine, SW NE 27-8n-3e, dry at 5,187 ft.

H. L. Hunt 55-F Goodpine, SE NE 17-7n-3e, 106 bbl. oil and 19 bbl. water, perf. casing 3,374-84 ft., T.D. 4,065 ft.

H. L. Hunt 56-F Goodpine, SE NE 17-7n-3e, 158 bbl. oil and 17 bbl. water, perf. casing 3,540-48 ft., T.D. 3,785 ft.

H. L. Hunt 61-F Goodpine, NE SW 17-7n-3e, dry at 3,838 ft.

Harry Shulman 1 Shapiro, SE cor. 38-7n-3e, 120 bbl., perf. casing 3,689-95 ft., T.D. 4,308 ft.

Olla, La Salle Parish: H. L. Hunt 34-F Goodpine, NW NE 18-10n-3e, 90 bbl. oil and 10 bbl. water, perf. casing 2,230-42 ft., T.D. 2,409 ft.

Placid Oil 94 La. Central, NW NE 76-10n-2e, 168 bbl. oil and 7 bbl. water, perf. casing 2,200-06 ft., T.D. 2,363 ft.

Placid Oil 104 La. Central, NE SW 2-9n-2e, 122 bbl. oil and 8 bbl. water, perf. casing 2,222-28 ft., T.D. 2,452 ft.

Placid Oil 110 La. Central, NE NE 10-9n-2e, 112 bbl. oil and 28 bbl. water, perf. casing 2,354-60 ft., T.D. 2,451 ft.

Sligo, Bossier Parish: Triangle Drlg. Co. 2-A Kerr unit, SW NE 24-17n-12w, 91 bbl. oil, perf. casing 3,126-38 ft.

Triangle Drlg. Co. 4-B Thigpen-Herold, SE NW 19-17n-11w, 95 bbl. oil, perf. casing 3,132-36 ft.

Sugar Creek, Claiborne Parish: Carter Oil 1 Caskeg, SE NW 31-20n-15w, 624 bbl., 5,810-16 ft., 16/64-in. choke.

Gholson & Hodge 1 Byrd, NE NW 18-19n-5w, 25,000,000 cu. ft. gas, perf. casing 5,732-43 ft., T.D. 5,776 ft., P.B. 5,743 ft.

Sugar Creek Synd. 4 Robinson, NE SW 33-20n-5w, dry at T.D. 5,993 ft.

Trout Creek, La Salle Parish: Berkshire Oil 1 Whatley, SE NW 19-8n-3e, dry at 4,810 ft.

ARKANSAS

Tide Water 1 Moore, Lafayette County wildcat, located in SW SE 29-17-24, held the most interest the past week as 9,503 ft. of 5½-in. casing was cemented for further testing. There are three zones which have shown possible commercial production, the first being in the Smackover lime from 9,330-40 ft. Another zone is from 8,042-56 ft., and the third from 7,160-67 ft. in the Cotton Valley formation.

Meanwhile, the Ohio 1 Garner, Lafayette County wildcat, in NW SW 13-16-24, did not show very great promise as it drilled ahead in the salt zone topped at 7,500 ft. It was last reported below 7,576 ft. and going ahead.

A new large producer has been completed in the Dorcheat field of Columbia County. It is Atlantic Refining 2-A Pinewood Lumber Co., SE NW NE 16-18s-22w. The well gaged 271 bbl. of condensate with 3,236,000 cu. ft. gas. Production was through perforations from 8,817-36 ft., total depth being 8,880 ft., plugged back to 8,856 ft. Flow was through 14/64-in. choke under pressure of 2,575 lb. on tubing and 2,625 lb. on casing. The gas-oil ratio was 11,940 to 1.

ARKANSAS COMPLETIONS

Dorcheat, Columbia County: Atlantic Ref. 2-A Pinewood Lbr. Co., SE NW NE 16-18s-22w, 271 bbl. condensate and 3,236,000 cu. ft. gas, 8,817-36 ft., T.D. 8,880 ft., P.B. 8,856 ft., T.P. 2,575 lb., C.P. 2,625 lb., gas-oil ratio 11,940 to 1.

Fouke, Miller County: Carter Oil 5 Sturgis, NE SW 1-17s-27w, 45 bbl. oil, 3,567-73 ft., T.D. 3,710 ft.

Troy, Nevada County: Berry Asphalt Co. 1 Hubbard, NW SE 5-14s-20w, pumped 22 bbl., 1,200-01 ft., T.D.

Smackover, Union County: Curtis Kinard 1 Dupree & Hill, NE SW 5-16s-16w, pumped 90 bbl. oil and 40 bbl. water, 2,538-39 ft., T.D. 2,738 ft.

EAST TEXAS BORDER COMPLETIONS

Pine Island-Smithland field, Marion County: H. H. Groneman 1 Stiles, 17 bbl., 2,291 ft.

Valley Osage Oil 1 Coor, dry at 2,474 ft.

W. M. Blackshare 1 Susie Chatten, top Paluxy 3,151 ft., dry at 3,505 ft.

Oklahoma Fields

(Continued from Page 233)

Empire, Stephens County: Skelly 27 Glass, NW SW SE 33-1s-8w, pumped 75 bbl. oil and 175 bbl. water, 5-in. 2,555 ft., ripped 2,217-33 ft., T.D. 2,589 ft.

Hewitt, Carter County: Cox 5 Carney, NE SW 15-4s-2w, old well drilled deeper from 1,986 ft. to T.D. 2,290 ft., sand 2,200-90 ft., pumped 25 bbl., 33.6 gravity.

West Holdenville, Hughes County: Tri Oil 3 Breeding, SE NE NW 12-7-8, pumped 18 bbl., sand 1,066-68 ft., shot, 7-in. 1,064 ft., T.D. 1,078 ft.

Miscellaneous, Le Flore County: Western Oklahoma 1 Bryan, SW NW SE 22-9-24, 2,500,000 cu. ft. gas, sand 5,000 ft., T.D. 5,550 ft., 7-in. 5,545 ft., perf. 5,001-40 ft.

Otoe City, Noble County: Superior 2 Faubian, NE SW SE 16-22-1, flowed 545 bbl., Wilcox 4,724 ft., 7-in. 4,722 ft., T.D. 4,731½ ft.

East St. Louis, Pottawatomie County: Eagle 3-A School Land-C, pumped 155 bbl. oil and 140 bbl. water Wilcox 4,120 ft., P.B. 4,117 ft. in dolomite, acid, T.D. 4,125 ft.

North St. Louis, Pottawatomie County: Panner 1 Denson, flowed 375 bbl., acid, 7-in. 3,860 ft., T.D. 3,920 ft.

Sasakwa, Seminole County: Suppes 1-D Spillman, NW NW SW 7-6-8, pumped 16 bbl., sand 1,145-52 ft., 7-in. 1,138 ft., perf. 1,148-59 ft., T.D. 1,250 ft., P. 1,195 ft.

East Seminole, Seminole County: McIntyre 1 Heller, SW NE NE 14-9-7, flowed 12 bbl., Wapanucka 3,401 ft., 7-in. 3,402 ft.

Tecumseh Lake, Pottawatomie County: Hall-Jordan 1 Pecore, SW NE SW 36-10-3, flowed 44 bbl. oil and 2 bbl. water, Wilcox 5,216-20 ft., perf. 5,198-ft., 7-in. 5,216 ft., T.D. 5,232 ft.

Magnolia 1 Lucas, SE SE SE 35-10-3, flowed 366 bbl. in 24 hr. through 1/32-in. choke, 11-in. 5,25[illegible] ft., T.D. 5,271 ft.

Northeast Wewoka, Seminole County: Moss 1 Harris Rogers, SE SE NE 16-8-8, pumped 15 bbl. oil and 8 bbl. water, Misener 3,964 ft., 7-in. 3,962 ft., T.D. 4,034 ft.

North Central Texas Fields

(Continued from Page 228)

Stone Sur. 6, 140 bbl. in 24 hr., 3,591-3,613 ft., 20-qt. shot, 3,595-3,614 ft.

States Oil 11 Morris, J. P. Stone Sur. 6, 180 bbl. in 24 hr., natural, 3,580-97 ft.

Triplett, Jones County: T. D. Humphrey 4 Triplett, John Hughes Sur. 256, 165 bbl. in 24 hr., natural, perf. casing 2,187-97 ft., T.D. 2,715 ft.

Miscellaneous Pools

Shackelford County: R. H. Roark 9 Elliott, Sec. 17, L.A.L. Sur., 37 bbl. in 24 hr., 825-30 ft.

Ungren & Frazier 5 Dyer "A," Sec. 86, T.&P. Sur., Blk. 12, dry at 985 ft.

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LOUISIANA GULF COAST

Lake Chicot Discovery Well Completed in Miocene Sand

By F. L. SINGLETON

NEW ORLEANS, La., Sept. 15.—The Louisiana Gulf Coast district marked up its fourth discovery within as many weeks by the completion of Amerada Petroleum Corp. and Phillips Petroleum Co. 1 State, located on the Lake Chicot prospect in St. Martin Parish. Total depth of the well is 9,995 ft., with 5½-in. casing cemented at 9,458 ft. Casing was perforated in the Miocene sand at 9,025-40 ft., and on an 18-hour gage flowing through a 5/32-in. choke, it flowed 204 bbl. of 40.2-gravity oil. Tubing pressure was 2,250 lb. The well is producing from the deepest of several oil and gas sands logged by an electrical survey at intervals from 7,700 ft. to total depth. The new discovery is situated in 31-11s-10e, on a block or several thousand acres, east of the Fausse Point field and northwest of the Bayou Pigeon field.

While this well was being completed, two of the district's latest discoveries, the Bastian Bay field in Plaquemines Parish, and the Lapeyrouse field, Terrebonne Parish, were being recompleted. Phillips 1 L. L. & E. Bastian Bay, Plaquemines Parish, originally completed through perforated casing at 9,147-49 ft., for an initial production of 324 bbl. daily through a 10/64-in. choke, was killed, and on a new test through perforated casing at 9,137-40 ft., it flowed gas-distillate through a ⅛-in. choke. The company apparently intends to test other sands logged by an electrical survey, and if they are not productive, recompletion is expected to be made in the original sand section.

Gulf 1 Picou, the discovery well of the Lapeyrouse prospect, Terrebonne Parish, is being recompleted due to salt-water intrusion. This well was originally completed in sand opposite perforated casing at 10,942-46 ft., and before it was killed for recompletion, it flowed 48 bbl. of fluid, of which 77 per cent was oil and 23 per cent was salt water. The sand section in which the well was tested was the lowest of three sands logged by an electrical survey, and these sands at 10,876-95 ft., and 10,850-64 ft. are expected to be tested. As the discovery well was being recompleted, the company announced location for another well, being 1 Eschette in 67-29s-18e, several hundred feet northwest of 1 Picou.

In the same parish, and located on the Point Au Fer prospect, Barnsdall 3 Nelson, completed the previous week as a gas-distillate producer, gaged 75,000,000 cu. ft. of gas and 25 bbl. of distillate per day flowing through open 2⅞-in. tubing. Production is from perforated casing in the Miocene sand at 6,700-20 ft., and while the well is now shut in it is reported that the company intends to kill and retest at 6,751-61 ft.

New Offshore Field in Prospect

Offshore from Iberia Parish in the Gulf of Mexico, Texas 1 State, Rabbit Island, appears to be the discovery well of a new field, although it is being abandoned due to mechanical trouble as the result of mechanical trouble caused by an attempted blowout at 8,520 ft. The blowout stuck the drill stem and the hole was abandoned leaving approximately 5,900 ft. of drill stem in the hole. The well is located south of West Cote Blanche Bay in Township 18s, Range 8e.

Gas-Distillate Production at Pecan Lake

Gas-distillate production in the Pecan Lake field, Cameron Parish, was assured of being extended several hundred feet southeast by Superior 2-B Miami Corp., in 29-14s-3w. The well is drilling ahead in shale below 10,596 ft., following a series of side-wall cores which logged gas-distillate sands at intervals from 8,190 to 10,186 ft., which correlate about normal with the discovery well.

New Sand at Welsh

Union Sulphur Co. is believed to have uncovered a new sand on the south flank of the old Welsh dome, Jefferson Davis Parish, by the attempted blowout of 3 Arceneaux in 28-9s-5w. Sand was drilled from 7,416-48 ft., where the well attempted to blow out, showing considerable oil. Mud is being conditioned and the well is expected to core ahead. It is generally believed that this sand correlates with the 8,200-ft. Frio sand in the Iowa field to the east. The well is in 28-9s-5w, and was drilled deeper after missing the 6,500-ft. sand opened by the company several months ago However, production from the 6,500-ft. sand appears

(Continued on Page 242)

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Greene County Test Gets Good Well in Big Injun Sand

By STAFF CORRESPONDENT

IN Jefferson Township, Greene County, Pennsylvania, the Equitable Gas Co. brought in a fair test on the Charles T. Stillwell farm at a total depth of 1,989 ft. The Big Injun was topped at 1,860 ft. and at 1,984-86 ft., there is a gas volume of 4,142,000 cu. ft. daily.

Of interest in the deep tests, T. W. Phillips Gas & Oil Co. topped the Onondaga lime at 5,773 ft. in the wildcat on the W. T. Beidenbach farm on the Kellersburg anticline in West Franklin Township, Armstrong County. The surface elevation was 1,170 ft. with the top of the Tully lime at 5,416 ft. The hole has been reduced and drilling resumed to explore the Oriskany sand.

On Chestnut Ridge in South Union Township, Fayette County, Peoples Natural Gas Co. set casing in the Onondaga chert at 6,554 ft. and now are drilling out cement in 5 Piedmont Coal Co. Peoples 4 Piedmont is drilling at 6,766 ft. without determining markers. Greensboro Gas Co. is drilling at 5,623 ft. in the test on the Barton lease. New Penn Development Co., William E. Snee et al 1 Carothers is below 5,528 ft. and 1 Kirby is drilling at 4,833 ft. The 4 Heyn (Summit Hotel) has the rig completed and waiting on tools.

On Laurel Ridge in Stewart Township, Fayette County, New Penn Development Co. et al are drilling at 8,490 ft. in the wildcat on the Gregg L. Neel farm or 186 ft. below the top of the Oriskany sand. So far it has been void. In Maryland these operators are making progress in the test on the Humberson farm on the Accident dome in Garrett County. The depth is now 6,690 ft.

In Greene County, Natural Gas Co. of West Virginia is drilling at 735 ft. in the deep test on the Andrew Workman farm just west of the Washington anticline in Richhill Township.

Armstrong County

Burrell Township: J. K. Sharp, Tr., 1 Lottie Manners, 199,000 cu. ft. gas, T.D. 1,468 ft.
Plum Creek Township: Apollo Gas Co. 2 Lewis Baker, 73,000 cu. ft. gas, Bradford sand, T.D. 3,511 ft.
Wayne Township: R. C. Galbraith et al 2 A. Rupp, 150,000 cu. ft. gas, Murraysville sand, T.D. 1,075 ft.
Peoples Natural Gas Co. 1 George Snyder, 42,000 cu. ft. gas, Tiona sand, T.D. 2,850 ft.

Clarion County

Monroe Township: Frank Shreffler 2 Tate Henry, 20,000 cu. ft. gas, Murraysville, Sheffield, and Bradford sands, T.D. 2,751 ft.

Greene County

Gilmore Township: Peoples Natural Gas Co. 1 Dora L. Eden, drilled deeper, 75,000 cu. ft. gas, Bayard stray 3,417 ft., gas 3,418 ft., bottom 3,428 ft., T.D. 3,503 ft.

WEST VIRGINIA

In Monongalia County, the test of the Hope Natural Gas Co. on the H. C. Greer et al lease in Morgan district, is again making hole and has reached 7,046 ft. It may reach the Onondaga within the week and is one of the most important tests now drilling as it is on a large structure of the northern closure, source of the chert and Oriskany gas in Fayette County, Pennsylvania.

In Lewis County, the test of the Hope Natural Gas Co. on the Alfred Woofter farm in Freemans Creek district has resumed drilling with the rotary and is now below 5,075 ft.

While gas completions were numerous and fair there was no new oil reported during the week. Oil operators are meeting and tabulating lifting-cost data to present as a state body to the administrator of OPA who set a ceiling on the price of crude.

Boone County

Peytona district, Owens, Libby-Owens Gas 17 Bull Creek Coal Land Co., 213,000 cu. ft. gas, Big lime, drilled through brown shale, T.D. 4,351 ft.
Sherman district: Pure Oil Co. 89 Federal Coal Co., through Berea, dry, T.D. 2,894 ft.

Braxton County

Otter district: Creed Yoak 1 Arlos McElwain, 80,000 cu. ft. gas, Injun sand, T.D. 2,408 ft., R.P. 300 lb.
Pittsburgh & West Virginia Gas Co. 7826 Lewis Dunn, dry, through Injun sand, T.D. 2,150 ft.
Salt Lick district: L. D. Nutter 3 S. A. Griffith, 47,900 cu. ft. gas, Injun sand, T.D. 2,310 ft.

Cabell County

Grant district: Monickle Gas Co. 2 George A. Alexander heirs, 119,000 cu. ft. gas before shot, Salt sand 1,260-1,450 ft., Big lime 1,573 ft., gas 1,536-1,638 ft., T.D. 1,685 ft.

Calhoun County

Center district: L. B. Carroll 14 fee, 50,000 cu. ft. gas, Big Injun 2,044-90 ft., Berea 2,455-60 ft., gas 2,453-2,560 ft., shot 2,450-60 ft., T.D. 2,470 ft.

Clay County

Buffalo district: Pittsburgh & West Virginia Gas Co. 7815 Elk River Coal Land Co., 1,212,000 cu. ft. gas, Blue Monday sand, T.D. 1,861 ft.

Harrison County

Eagle district: Hope Natural Gas Co. 1 Lemour Robinson, 200,000 cu. ft. gas, Fifth sand 2,492-96 ft., gas 2,492-93 ft., T.D. 2,515 ft.

Mingo County

Kermit district: Dixie Oil & Gas Co. 2 Thomas Harvey, 500,000 cu. ft. gas, Berea, drilling at 2,800 ft.

Putnam County

Curry district: Summit Gas Co. 1 Viril A. Caldwell, 75,000 cu. ft. gas, Salt sand 1,020-1,430 ft., Big lime 1,482-1,654 ft., Big Injun 1,699-54 ft., Berea 2,194-2,221 ft., T.D. 2,222 ft., R.P. 575 lb.
Randolph Gas Co. 1 D. L. Craddock, 94,000 cu. ft. gas, Salt sand 940-1,045 ft., Big lime 1,518-1,695 ft., Big Injun 1,740-1,825 ft., Berea 2,240-67 ft., T.D. 2,289 ft.

Ritchie County

Grant district: Nollem Oil & Gas Co. 1 Rachel Cain, drilled deeper, 92,000 cu. ft. gas, through Injun sand, gas from Maxton sand, T.D. 1,965 ft.
Murphy district: Clem S. Morris 1 fee, 46,000 cu. ft. gas, Injun sand, T.D. 1,910 ft.
Union district: Phillip M. Lemon 1 L. S. Clayton heirs, dry, through Injun sand, T.D. 1,895 ft.

(Continued on Page 242)

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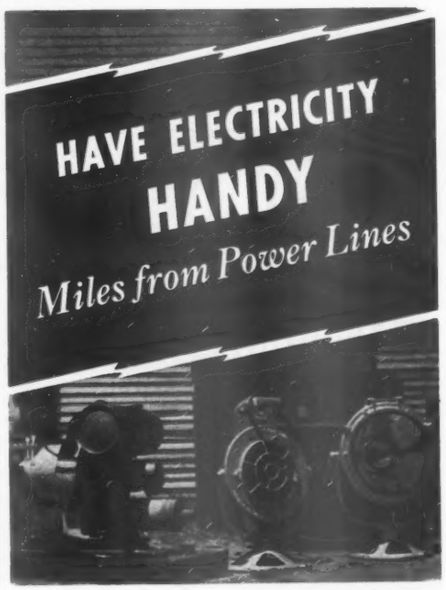

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Lansing and Arbuckle Show Oil North of Doran Pool

By ROBERT INGRAM

THE Doran pool of Rice County, productive from the Arbuckle dolomite, drew attention last week as operators prepared to test the Lansing-Kansas City and Arbuckle formations at Lauck & Moncrief 1 Gizzell in the S½ SE SW 7-19-9w. The outpost, situated ½ mile north of the Doran pool, and ¾ mile south of the Haferman pool, was bottomed at 3,294 ft. in Arbuckle dolomite topped at 3,290 ft. A 10-ft. porous section in the Lansing series was to be treated and showings in the Arbuckle will be tested. Five-inch casing was set at 3,290 ft.

SUMMARY OF COMPLETIONS

Kansas

	No.	Bbl.	Footage
Oil wells: Fields	29	40,304	96,931
Dry holes: Fields	6	.....	20,619
Wildcats	10	.....	35,292
Total	45	.....	152,842

Nebraska

	No.	Bbl.	Footage
Dry holes: Wildcats	3	.....	7,644

Trego Wildcat Finds Saturation In Arbuckle

Trego County claimed attention at a rank wildcat 13 miles due east of the town of Wakeeney, the county seat, and 7 miles northeast of the Rega discovery oil well. Joe A. Aylward and Aylward Production Co 1 Schaefer, SE SE NE 10-12-21w, set and cemented 5½-in. casing at 3,998 ft. Operators will test saturation observed in a 3-ft. recovery of core at 4,000-03 ft., which carried dolomite with fair oil showing; formation is in Arbuckle topped at 3,998 ft. and penetrated to 4,003 ft. Earlier small showings of oil were logged in cuttings at 3,396-98 ft. and from 3,408-13 ft.

Arbuckle Production Extended ½ Mile Southwest at Kraft

Productive limits of the Kraft pool of northern Barton County were extended ½ mile southwest.

Gulf Oil Corp. 1 Krautwurst, N½ NE SE 9-17-11w, filled with oil in 7 hours after crews drilled out cement plug in the 7-in. casing cemented at 3,262 ft. Crews swabbed the hole down 1,900 ft. in 2 hours during which period, the well tanked 138 bbl. of oil. Fluid level was held at 1,900 ft. while swabbing 77 bbl. of oil per hour for 3 hours. Tubing and rods were run and state potential was due to be taken late in the week.

KANSAS COMPLETIONS

Wildcats

Barton County: Helmerich & Payne 1 Unruh, E½ NE SW 16-20-15w, dry at 3,872 ft.
Brown County: McAlpine et al 1 Tyler, NE SW SW 4-3-15e, dry at 1,550 ft.
Edwards County: Continental 1 Beatty, W½ W½ SW 35-25-20, dry at 5,256 ft.
Pratt County: Skelly 1 Ganawaym, E½ NE SE 30-28-12, dry, Arbuckle 4,667-83 ft.
Rice County: Aladdin Pet. Co. 1 Gray, E½ NE SE 35-18-8w, dry, Arbuckle 3,342-82 ft.
J. Lindas 1 Patterson, NW NE NW 23-19-9w, dry, Arbuckle 3,281-3,312 ft.
Rocket Drlg. Co. et al 1 Shepherd, W½ NW NW 6-21-9w, dry at 3,427 ft.
Russell County: Phil Han Oil Co. 1 Ney, SE SE SE 2-5-12w, dry, Arbuckle 3,213 ft.
Sheridan County: Ingling & Parker 1 Tompkins, NW NW SE 20-8-30w, dry at 2,644 ft.
Stafford County: Williams-Wilson 1 Wilson, N½ NW NW 5-25-14w, dry, Kansas City-Lansing at 3,953 ft.

Fields

Atherton, Russelll County: H. H. Blair 1 Miller, SE SE SE 29-13-14w, dry at 3,382 ft.
Bedford, Stafford County: British American 5 Meyer, SE SW NE 28-23-12w, potential 3,000 bbl., Arbuckle at 3,849 ft.
Burnett, Ellis County: Dickery B-4 Carmichael, 18-11-17w, potential 3,000 bbl., Arbuckle at 3,358 ft.
Chase, Rice County: Bay Petro. 1 Marshall, NE SW NW 8-19-9w, dry at 3,292 ft.
Cunningham, Pratt County: Drillers 2 Gerber, N½ SE NE 35-27-11w, 52 bbl., Kansas City-Lansing at 3,729 ft.
Doran, Rice County: Phillips 1 Kate, S½ SE NW 18-19-9w, 133 bbl., Arbuckle at 3,278 ft.
Edwards, Ellsworth County: Continental 1 Buehler, SW NE NE 33-17-6w, potential 3,000 bbl. at 3,219 ft.
Frog Hollow, Cowley County: Leader 4 Anna Moon, NW NW NW 21-32-5e, swabbed 77 bbl., Bartlesville at 3,055 ft.
Gorham, Russell County: Transwestern 2 Polcyn, SE NW NW 14-14-15w, 367 bbl., Gorham at 3,229 ft.
Greenvale, Russell County: Cities Service 3 Schartz, N½ NW SE 5-15-12w, 2,155 bbl., Gorham at 3,232 ft.
Hadley, Ellis County: Champlin 13 Hadley-D, N½ SE SE 17-11-17w, dry at 3,797 ft.
Hall-Gurney, Russell County: J. J. Hall D-28 E. Miller, N½ SE SW 30-14-13w, 1,341 bbl., Kansas City at 2,940 ft.
Krier, Barton County: Springer 1 C. North, E½ SE NW 30-16-11w, potential 3,000 bbl., Kansas City 3,035 ft.
Gulf 3 Joseph, E½ NW SW 29-16-11, 50 bbl., Gorham at 3,319 ft.
Laton, Rooks County: Cities Service 2 Reese, N½ NE SE 3-9-16w, 177 bbl., Kansas City at 3,177 ft.
J. J. Hall 1 Dorr, W½ NW SE 13-9-16w, 190 bbl., Kansas City at 3,351 ft.
Lost Springs, Marion County: Harwood 11 Novak, SW SE SW 28-17-4e, 322 bbl., chat at 2,424 ft.
Niedenthal, Russell County: John Lindas 4 Boxberger, E½ SW SW 24-14-15w, dry at 3,382 ft.
Otis, Rush County: Morgan-Flynn-Cobb 3 Schroeder, E½ NW SE 23-18-16w, 1,113 bbl., Reagan at 3,548 ft.
Prusa West, Barton County: Armer et al 1 Ney-B, W½ NW SE 7-16-11w, dry at 3,373 ft.
Ray, Phillips County: Barnett Drlg. B-1 Ray, NE NE NW 32-5-20w, potential 3,000 bbl., Reagan at 3,601 ft.
Raymond, Rice County: Vickers A-3 Rose, S½ NW SW 20-20-10w, 2,618 bbl., Arbuckle at 3,293 ft.
Beardmore 2 Oberle, SE NE SE 18-20-10w, 395 bbl., Kansas City at 3,120 ft.
Rick, Barton County: Cities Service 1 Rader, NW NW NW 12-19-11w, 442 bbl., Kansas City at 3,124 ft.
E. Jones 1 Doll, S½ SW NW 1-19-11w, dry at 3,393 ft.
Texas 1 J. Birzer, SE SE SE 14-19-11w, potential 3,000 bbl., Kansas City at 3,223 ft.
Silica, Barton County: Sharon 1 Herter, S½ NW NE 17-20-11w, swabbed 69 bbl., Arbuckle at 3,311 ft.
Silicia West, Barton County: Crown Petroleum et al 1 Scheufler, E½ NW NW 18-20-11w, potential 3,000 bbl. at 3,325 ft.
C. E. Ash 3 Schartz, W½ SE SW 7-20-11w, potential 3,000 bbl., Arbuckle at 3,321 ft.
Trapp, Barton County: Shell B-8 Ehrlich, NW SE SW 1-16-14w, swabbed 61 bbl., Arbuckle at 3,328 ft.
Shell B-3 Batt, SE NE SE 2-16-14w, 1,079 bbl., Arbuckle at 3,303 ft.
Zenith, Stafford County: A. M. Landon 1 McClure, E½ NE SW 15-24-11w, 99 bbl., Misener at 3,805 ft.
Stanolind 4 C. Hays, NW SE NW 11-24-11w, potential 3,000 bbl., Viola at 3,801 ft.
Stanolind 5 M. Kirkpatrick, W½ NW NW 15-24-11w, 2,514 bbl., Viola at 3,829 ft.

Two Twin Wells Brought in At Falls City; Pool Extended

ST. JOSEPH, Mo., Sept. 15.—Two new producers in the second Hunton lime zone were drilled the past week in the Falls City pool of Richardson County, Nebraska. Harry Harper 6 Sibbernsen came in as a twin to 1 Sibbernsen and Skelly Oil Co. 5 Davisson came in as a twin to 1 Davisson. R. L. Campbell and Ohio Oil Co. brought in 1 Sandrock as an east extension to the field. This will produce from the top of the lime. Ohio also expected a producer at 2 Keim Workman and was drilling 2 Sibbernsen, Account 2.

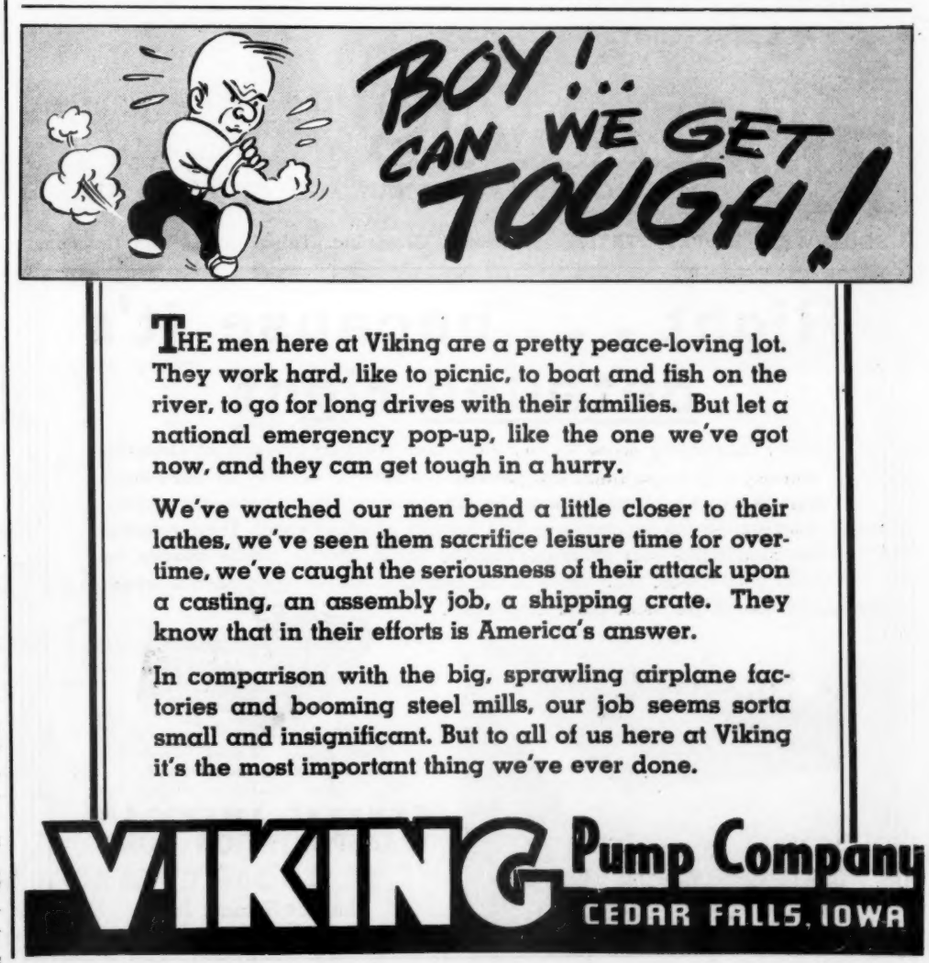
In the one-well Salem pool of Richardson County, Frank Power and associates will try again to offset the Uhri Oil Co.'s 1 Ogle. Their last attempt failed when tools were lost in the hole.

Ed Jackson had what seemed to be an oil well and a gas well in the McLouth pool of Jefferson County, Kansas.

NEBRASKA COMPLETIONS

Wildcats

Richardson County: National Petroleum 1 Oswald, NW SW 15-2n-14e, Hunton 2,565 ft., dry, T.D. 2,661 ft.
James I. Darst 1 Horn, E½ NE SE 35-3n-16e, dry, Hunton 2,559 ft., T.D. 2,654 ft.
Nemaha County: Kees et al 1 Kiechel, SE SE SE 4-5n-13e, dry, Hunton 2,245 ft., T.D. 2,425 ft.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VIKING Pump Company
CEDAR FALLS, IOWA

Appalachian Fields

(Continued from Page 240)

Taylor County

Booth Creek district: Pittsburgh & West Virginia Gas Co. 6121 Charles Baker, 250,000 cu. ft. gas, Big Injun 716-30 ft., gas 719-30 ft., T.D. 730 ft.

Wayne County

Union district: West Virginia Gas Corp. 2 Wayne County Poor farm, 84,000 cu. ft. gas, Big lime 1,170-1,330 ft., Big Injun 1,345-1,480 ft., Berea 1,969-2,003 ft., T.D. 3,116 ft.

Owens, Libby-Owens 1 B. C. and C. C. McGinnis, 215,000 cu. ft. gas, Big lime 1,201-1,362 ft., Injun 1,362-1,462 ft., Berea 2,013-39 ft., brown shale 2,474-2,907 ft., Corniferous lime 3,162 ft., shot 2,464-2,911 ft. with 4,200 lb. Dentonite, T.D. 3,164 ft.

Wood County

Williams district: M. W. Athey et al 11 Charles Lauer, dry, Cow Run sand, T.D. 872 ft.

ORISKANY GAS FIELDS

Jackson County

Washington district: Columbian Carbon Co. 7 Putnam Co., 6367,000 cu. ft. gas before shot, Big lime 1,761-1,845 ft., Injun 1,921-90 ft., Berea 2,385 ft., Corniferous lime 4,997-5,107 ft., Oriskany 6,107-5,143 ft., gas 5,112 ft., gas 5,146 ft., T.D. 5,161 ft.

Louisiana Gulf Coast Fields

(Continued from Page 237)

to be limited to a small area as one gas well and a dry hole have been completed in the area.

On the east flank of the Bayou Blue dome, Iberville Parish, Union Sulphur 3 Schwing Lumber & Shingle Co. is bottomed in oil sand at 6,610 ft. and casing is expected to be cemented for completion. Top of the sand was logged at 6,598 ft., while an electrical survey showed another sand at 6,530-45 ft. The sand was logged about normal with the company's 2 Schwing, completed several weeks ago to open a new producing area for the structure.

Deep Sand Defined at Pine Prairie

Deep-sand production on the east flank of the Pine Prairie dome, Evangeline Parish, was defined to the southwest with the abandonment of Nicklos Drilling Co. 1 Reed at a depth below 9,400 ft. No shows were encountered in the 8,100-8,200-ft. pay. The abandonment marks the first dry hole to be drilled in the area since production was established several months ago.

LOUISIANA GULF COAST COMPLETIONS

Wildcats

Calcasieu Parish: Gulf 1 Calcasieu National Bank, well blew out, cratered, junked and abandoned, T.D. 10,534 ft.

Rapides Parish: M. H. Marr 1-A Lee Lumber Co., dry, T.D. 6,110 ft.

St. Landry Parish: Bartle & Brewster 1 Richard, dry, T.D. 9,010 ft.

Fields

Anse La Butte, St. Martin Parish: Stanolind 6 Bergeron, 113 bbl., 5/8-in. choke, perf. casing 6,250-80 ft., T.D. 6,303 ft.

Bayou Sale, St. Mary Parish: Humble 1 Canal Bank & Trust Co., 408 bbl., 1/8-in. choke, perf. casing 10,100-10 ft., T.D. 10,110 ft.

Bayou Blue, Iberville Parish: Superior 15 Schwing Lumber & Shingle Co., 190 bbl., 1/8-in. choke, T.D. 6,272 ft., P.B. T.D. 5,745 ft.

Cameron Meadows, Cameron Parish: Burton-Sutton 6-A Cameron Parish School Board, 600,000 cu. ft. gas, T.D. 8,521 ft., P.B. 4,640 ft.

Chacahoula, La Fourche Parish: Sun 9 Dibert-Stark, dry, T.D. 7,460 ft.

Jefferson Island, Iberia Parish: Texas 5 State, 291 bbl., 10/64-in. choke, perf. casing 8,740-80 ft., T.D. 9,189 ft.

Jennings, Acadia Parish: George Michael, 31 bbl. oil plus 10 bbl. salt water, pumping, T.D. 2,555 ft., P.B. T.D. 1,786 ft.

Lake Salvador, St. Charles Parish: Texas 9 State, 476 bbl., 7/32-in. choke, perf. casing 9,706-35 ft., T.D. 10,205 ft.

Pine Prairie, Evangeline Parish: Gulf 1 Shatzkin, 365 bbl., 7/32-in. choke, perf. casing 8,138-48 ft., T.D. 8,158 ft.

Port Barre, St. Landry Parish: Grubb & Hawkins 2 Watkins, 140 bbl., 1/8-in. choke, perf. casing 5,928-58 ft., T.D. 6,259 ft.

Potash, Plaquemines Parish: Humble 53 Orleans Levee District, 632 bbl., 1/4-in. choke, perf. casing 8,430-50 ft., T.D. 8,495 ft.

Richie, Acadia Parish: Bering 1 L. O. Wade, dry, T.D. 3,513 ft.

St. Gabriel, Iberville Parish: Shell 2 Gueymard, 292 bbl., 10/64-in. choke, sand 8,626-40 ft.

Ville Platte, Evangeline Parish: Continental 3 Pitre, 204 bbl., 10/64-in. choke, T.D. 10,204 ft., P.B. T.D. 10,000 ft.

R. A. Irwin 2 Johnson, 475 bbl., 1/4-in. choke, perf. casing 10,160-70 ft., T.D. 10,202 ft.

Vinton, Calcasieu Parish: E. H. Robertson 1 Vincent, 100 bbl., 10/64-in. choke, perf. casing 3,220-42 ft., T.D. 3,294 ft.

West Bay, Plaquemines Parish: Gulf 1 State, 453 bbl., 7/32-in. choke, T.D. 7,367 ft.

West Lake Verret, St. Martin Parish: Shell 6-A Norman-Breaux, dry, T.D. 3,560 ft.

California Fields

(Continued from Page 230)

that it is believed the 6,400-ft. zone in the Cat Canyon field has been found by the A. E. Bell Corp in 1 Gilmore in 23-9n-33w at 5,350 ft. This indicates that the zone has been picked up almost 1,000 ft. higher structurally than Standard Oil Co. found the same zone on the Los Flores lease which is located rather far out on the west flank of the West Cat Canyon field and indicates also that this zone may prove to be an important horizon. It is generally conceded that Bell Corp. 3 Gilmore is the most important well drilling in the Cat Canyon at the present time. The new well of Bell Corp. and Standard's Los Flores wells are about 1 mile apart so that if the former gets a good well it will open up all the intervening area for development. Recent development in the Los Flores area tends to indicate that Union Oil Co. holds a large crude-oil reserve in this area in both the Pliocene and Miocene. The so-called Los Flores zone found by Standard over a year ago is of Miocene age and has excellent porosity but apparently lacks sufficient gas pressure to result in a natural flow.

COASTAL DISTRICT COMPLETIONS

Elwood, Santa Barbara County: Barnsdall 88-12 Tideland, 15-4n-29w, flowed 500 bbl., 41.9-gravity, 3 per cent cut, 48/64-in. bean, pressures 250/500 lb., T.D. 4,300 ft., P.B. 4,220 ft., perf. 4,181-4,220 ft., completed in Sespe oil sand of Miocene age.

Newhall, Los Angeles County: St. Anthony Oil Co. 1 La Salle, 10-3n-16w, abandoned as unproductive commercially at 5,416 ft. in very hard brown shale, had fair oil and gas showings higher up in hole but formation was too tight to produce.

Santa Maria Valley, Santa Barbara County: Hancock-Bush Oil Co. 4 Cal. Lands, 30-10n-33w, pumped 425 bbl., 15.1-gravity, 5 per cent cut, T.D. 4,792 ft., P.B. 4,585 ft., perf. 3,921-4,576 ft., completed in Monterey oil sand of Miocene age.

Union 4 Stinson, 28-10n-34w, pumped 312 bbl., 14.3-gravity, 30 per cent cut, T.D. 5,415 ft., perf. 5,097-5,413 ft., completed in Monterey oil sand of Miocene age.

Ventura Avenue, Ventura County: General Pet. 20 Barnard, 21-3n-23w, flowed 1,032 bbl., 28.8-gravity, 3 per cent cut, 739,000 cu. ft. gas, 64/64-in. bean, pressures 100/200 lb., T.D. 9,088 ft., P.B. 9,080 ft., perf. 8,460-9,080 ft., completed in lower 57 zone of Pliocene age.

Associated 11 Hartman, 21-3n-23w, flowed 753 bbl., 26.4-gravity, 10 per cent cut, 803,000 cu. ft. gas, 64/64-in. bean, pressures 125/500 lb., T.D. 8,670 ft., perf. 8,422-8,668 ft., deepened from 7,513 ft. to 57 zone of Pliocene age.

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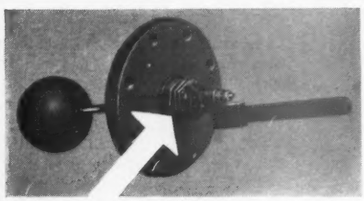

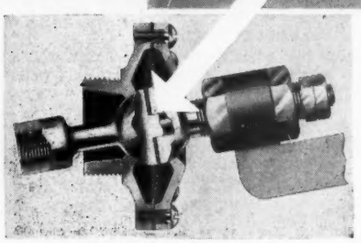

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SOUTHWEST TEXAS

Wildcat Northeast of Luby May Open New Field

By F. L. SINGLETON

CORPUS CHRISTI, Tex., Sept. 15.—George B Buescher 1 Gillette, a wildcat located 1½ miles northeast of the Luby field, Nueces County, looms as the discovery well of a new field following a drill-stem test which showed favorable indications. Oil sand was cored at 7,309-14 ft., and on a 12-minute drill-stem test 4,000 ft. of pipe-line oil was recovered. Working pressure was 4 lb. and bottom-hole flowing pressure was 3,150 lb. The well had previously shown for a producer at 6,952-57 ft. where a drill-stem test recovered a small amount of high-gravity oil and tested 750-lb. working pressure. The sand section is believed to be the basal Frio sand which is a new sand for the Luby area, bieng several hundred feet deeper than the Catahoula and Heterostegina sands at 4,000 and 5,000 ft. The well is located in the Robert & White subdivision of the Schallert tract, Lot 6, in the Canutillo Colonly Ditch Survey. Protection in the area is held by Stanolind Oil & Gas Co., Sinclair Prairie Oil Co., Atlantic Refining Co., Richardson Petroleum Co., and several independent operators.

Oil Production on Northeast Flank of Agua Dulce

Oil production was established on the northwest flank of the Agua Dulce field, Nueces County, with the completion of S. E. W. Oil Corp. 1 First Trust Joint Land Bank, which is flowing at the daily rate of 102 bbl. of 42.8-gravity oil through a ⅛-in. choke. Shut-in casing pressure was 1,650 lb., and tubing pressure 650 lb. The well was drilled to a total depth of 6,897 ft., and completion was made by perforating casing opposite sand at 5,560-75 ft. The completion opens the third oil area around the flanks of the structure and is expected to increase exploration along the entire Agua Dulce-Stratton trend.

With the completion of the above well, interest in the area was shifted to Sam E. Wilson and Gulf Plains 1 M. L. Rivers located on the extreme southwest flank of the Stratton field which is coring ahead in sandy shale below 6,564 ft. This well seems certain of opening a new producing area about 2 miles from production as the result of a drill-stem test the previous week at 5,728-79 ft. which recovered pipe-line oil. Additional showings are reported to have been logged the past week, and on a 5½-minute drill-stem test at 5,828-55 ft., tested 70 lb. working pressure and recovered 408 ft. of oily mud.

New Producing Sand in Odem

Oil production from another sand appears to have been opened in the Odem field, San Patricio County, by Wellington Oil Co. 3-B J. Welder, which is drilling below 6,700 ft., following a 10-minute drill-stem test at 6,747-54 ft., that tested 1,850 ft. of 43-gravity oil. The well is expected to be drilled deeper to test the 6,900-7,000-ft. pay which is classified as a gas-distillate sand. The 6,700-ft. sand is the fourth sand to be found, three of them being found this year which has resulted in a revival of development for the structure which was discovered in 1939. Main production has been from the 5,300-5,400-ft. pay found on the upthrow side of a fault and 3-B Welder is believed to have opened production on the downthrow side of the fault which extends through the field.

South Campana Extensions Indicated

Approximately 1½ miles southwest of the South Campana field, McMullen County, additional development was assured by the showing of Transwestern 1 W. I. Ferguson. Total depth of the hole is 3,135 ft., and the well is testing through perforated casing at 3,067-70 ft., showing oil and gas with tubing pressure 950 lb., and casing pressure 1,045 lb. The field proper was extended several locations east by Argo Oil Corp. 4-I Edrington, which recovered 750 ft. of oil and tested 150 lb. working pressure on a drill-stem test in the Pettus sand at 3,015-29 ft., the total depth. Casing is being cemented for completion. While development of this structure is in the early stages, it is showing promise of being one of the best shallow discoveries to be found in the Laredo district this year.

SOUTHWEST TEXAS COMPLETIONS
LOWER GULF COAST DISTRICT
Wildcats

Jim Wells County: W. H. Spice 1 Reed & Lindsay, dry, T.D. 5,710 ft.

San Patricio County: Chiltipin Oil Co. 1 Lula McCrae, dry, T.D. 4,865 ft.

(Continued on Page 245)

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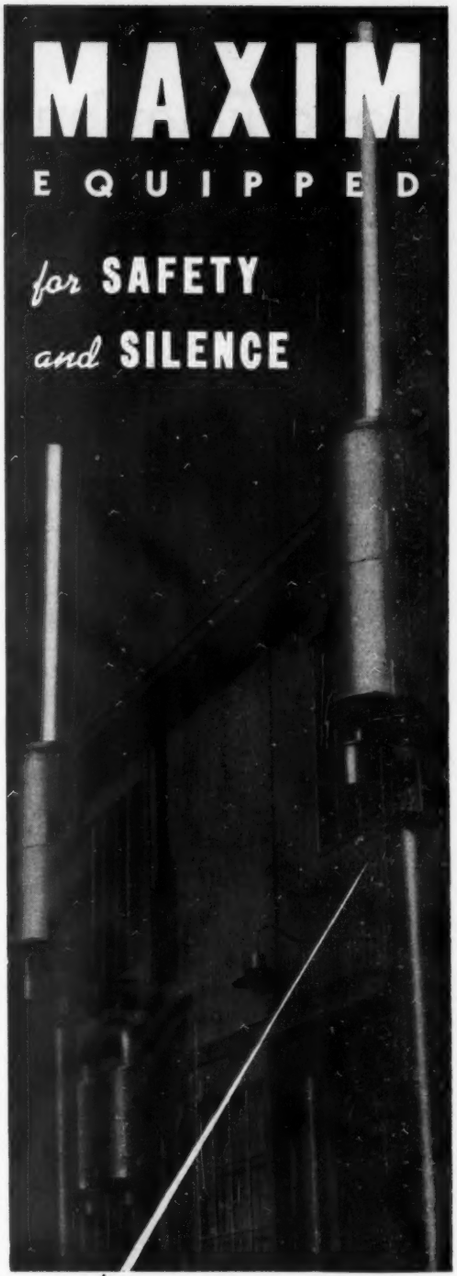

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Todd Ellenburger Discovery Plugged Back to Upper Pay

By D. H. STORMONT

MIDLAND, Tex., Sept. 15.—A 1-mile northwest extension for the deep Todd pool of north central Crockett County was assured at the end of the week by the Amerada Petroleum Corp. 1-B Todd, Section 26, Block WX, G.C.&S.F. Survey. Definite assurance of the extension came after the second treatment with 4,000 gal. of acid. On the initial test after treatment the test flowed and swabbed 125 bbl. of fluid in 17½ hours, cut 3.2 per cent by basic sediments and water.

No. 1-B Todd was drilled to the Ellenburger, Lower Ordovician, lime and for a while promised to become the county's first producer from this section by swabbing 34 bbl. of oil in 12 hours. However, during the 12-hour swabbing period the yield dropped steadily and operators decided to plug back from 6,300 ft. to 6,103 ft.

Production is coming from casing perforations from 6,048 to 6,065 ft. opposite the crinoidal lime section of the lower Pennsylvanian. The oil tested 40.7 gravity at 69° and gas-oil ratio was estimated at 750 to 1.

Henderson-Couch Discovery Gaged

R. H. Henderson 1 Clara Couch, Section 37, Block GG, H.E.&W.T. Survey, which was reported 2 weeks ago as showing for a possible strike in western Crockett County was officially completed at the first of the week. Flowing 42 bbl. of 24.5 pipe-line oil during the last 3 hours of a 6-hour gage, the discovery well was assigned a potential of 352 bbl. The gage was through open 2-in. tubing and followed a 3,000-gal. acid treatment in the Permian lime at 2,180-86 ft.

The new pool is without pipe-line outlet but operators plan to truck the oil to the nearest pipe-line pumping station which is about 25 miles away.

No. 1 Couch is on a 160-acre lease obtained from Shell Oil Co., Inc., and is 9 miles southeast of the Noelke field, which was opened last year to set off exploration in the western part of the county. Nearest production is at the Moore-Olson 1 Noelke, a discovery well 4½ miles northwest.

SOUTHERN WEST TEXAS COMPLETIONS

(24-hr. ratings based on last 3 hr. of 6-hr. gage)

Wildcats

Crockett County: R. H. Henderson 1 Clara Couch, 467 ft. from N and 2,173 ft. from E lines Sec. 37, Blk. GG, H.E.&W.T. Sur., elev. 2,733 ft., 88 bbl. in 6 hr., est. 352 bbl., 3,000 gal. acid, top Yates 1,255 ft., pay 2,166-86 ft.

Ector County: Sinclair Prairie 1 Johnson, 2,200 ft. from S and 440 ft. from E lines Sec. 31, Blk. 42, T.&P. Sur., elev. 3,010 ft., dry at 4,341 ft.

Pecos County: A. Hargrove 1 University-Continental, NE cor. Sec. 4, Blk. 7, University Sur., elev. 2,595 ft., dry at 1,746 ft.

Gulf Oil 1 Millar, Sec. 29, Blk. 11, H.&G.N. Sur., elev. 2,577 ft., top Yates 821 ft., granite 4,534 ft., dry at 4,538 ft.

Pure Oil 1 T.&P. Lands, Tr., 660 ft. from W and 1,980 ft. from S lines T.&P. Sur., elev. 3,277 ft., dry at 417 ft.

Reagan County: Amerada 1-RA University, 1,980 ft. from N and 600 ft. from E lines Sec. 3, Blk. 48, University Sur., elev. 2,768 ft., 189 bbl. in 4 hr., 1-in. choke, top Yates 1,410 ft., Ellenburger 8,960 ft., pay 9,010-82 ft., P.B. from 9,294 ft.

Tom Green County: Provine & O'Quinn 1 Funk, Sec. 37, Blk. 5, H.&T.C. Sur., elev. 2,405 ft., top Blaine 920 ft., dry at 1,175 ft.

Fields

Estes, Ward County: Gulf 149 Estes, elev. 2,619 ft., 397 bbl., 370-qt. shot, 2,542-2,675 ft.

Texas 2-C University, elev. 2,610 ft., 282 bbl., 40/64-in. choke, 1,000 gal. acid, 2,656-77 ft., P.B. from 2,680 ft.

Texas 9-E University, elev. 2,616 ft., 1,187 bbl., 1-in. choke, 100-qt. shot, 2,651-85 ft.

Foster, Ector County: Forest Dev. Co. 15-H Moss, elev. 2,936 ft., 567 bbl., 405-qt. shot, 4,060-4,195 ft.

Goldsmith, Ector County: Gulf 369 Goldsmith, elev. 3,132 ft., 341 bbl., 70-qt. shot, 4,165-93 ft., pay 4,108-98 ft.

Johnson, Ector County: Atlantic 4-D Johnson, elev. 2,980 ft., 252 bbl., 5 per cent water, 400-qt. shot, 4,106-4,212 ft., P.B. from 4,220 ft.

Atlantic 8-E Johnson, elev. 2,961 ft., 704 bbl., 360-qt. shot, 4,135-4,247 ft.

Atlantic and Tide Water 2-B Blakeney, elev. 3,072 ft., 357 bbl. oil and 40 bbl. water, 1-in. choke, 360-qt. shot, 4,110-4,220 ft.

Sinclair Prairie 4 Palmer, elev. 2,969 ft., 489 bbl., 11 per cent water, 340-qt. shot, 4,168-4,254 ft., P.B. from 4,282 ft.

Jordan, Ector County: Cities Service 8-B University, 459 bbl., 1-in. choke, 1,000 gal. acid, 3,575-3,615 ft.

Keystone, Winkler County: Standard 16-12 Baird, elev. 2,915 ft., 287 bbl. 300-qt. shot, 3,216-3,352 ft., T.D. 3,340 ft.

Lehn, Pecos County: Burk Royalty 3-C Sullivan, elev. 2,445 ft., 84 bbl., ¼-in. choke, 40-qt. shot, 1,698-1,709 ft., T.D. 1,726 ft.

H. L. Gain and Sam Dunn 1 Downs, elev. 2,469 ft., 990,000 cu. ft. gas, perf. casing 1,412-1,502 ft., P.B. from 1,553 ft.

McCamey, Upton County: T. P. Coal & Oil 1 Egolff, elev. 2,820 ft., 242 bbl., 600-qt. shot, 2,940-3,090 ft., T.D. 3,239 ft.

McElroy, Crane County: Gulf 251 McElroy, elev. 2,563 ft., 502 bbl., 925-qt. shot, 2,790-93 ft., T.D. 3,003 ft.

North Cowden, Ector County: Phillips 5 Ember, elev. 3,208 ft., 86 bbl. oil and 12 bbl. water, 110-qt. shot, 4,243-77 ft., T.D. 4,280 ft.

Stanolind and Delaney 4-B Smith, elev. 3,037 ft., 308 bbl., 530-qt. shot, 4,175-4,365 ft., T.D. 4,400 ft.

Stanolind and Delaney 3-C Smith, elev. 3,036 ft., 190 bbl. oil and 24 bbl. water, 55-qt. shot, 4,295-4,315 ft., T.D. 4,320 ft.

Texas 11 Holt, elev. 3,109 ft., 149 bbl., 460-qt. shot, 4,360-4,500 ft.

O'Brien, Ward County: Mid-States 11 Llano-Sloan, elev. 2,519 ft., 300 bbl., 55-qt. shot, 2,574-2,609 ft.

Sinclair Prairie 30 Archenhold, elev. 2,516 ft., 398 bbl., 3,500 gal. acid, 2,430-2,980 ft.

Taylor-Link, Pecos County: Sam Letwin 1-E University, elev. 2,533 ft., 783 bbl., ¼-in. choke, 2,400 gal. acid, 1,591-1,635 ft.

Tobarg, Pecos County: Stanolind 11-B Smith, elev. 2,430 ft., 75 bbl., 437-57 ft.

Stanolind and Continental 77-C Tippett, elev. 2,470 ft., 39 bbl., 450-517 ft.

White & Baker, Pecos County: Cardinal Oil 3-J White & Baker, elev. 3,061 ft., 113 bbl., 100-qt. shot, 3,124-55 ft.

World, Crockett County: H. G. Eastham 1 Powell-Gulf, elev. 2,805 ft., junked and abandoned at 2,559 ft.

Yoakum and Gaines County Wildcats Started

Northern West Texas gained two new wildcat tests and lost one during the week. Yoakum County was given its third test by the Honolulu Oil Corp. at 1-13 L. W. Wright. The wildcat is only 2 miles west of the Terry County line. It is 3½ miles northeast of the Big Chief Drilling Co. 1 Barrier, a failure at 5,501 ft. and 4 miles southeast of another dry hole drilled by Magnolia Petroleum Co. at 5,292 ft. Exact location is 467 ft. from the north and west lines of Section 13, Block D, John D. Gibson Survey, in the northwestern part of the county.

A 7,200-ft. wildcat test of the Clear Fork, lower Permian, lime is under way in extreme northwestern Gaines County. The project is being drilled by Likins & Hall of Midland, Tex., at 1 Dr. E. H. Jones on the Rancho Dos Cases, SW NW Section 13, Block A-7, P.S.L. Survey, 2 miles east of the Lea County, New Mexico, line.

No. 1 Jones is 10½ miles west of the southernmost production on the Gaines side of the Wasson field and is in an area which has undergone considerable shallow Permian exploration. About 2½ miles southeast are two dry holes and about the same distance northwest is a third. All three of the failures had an oil show in the San Andres horizon of the Permian lime.

Abandonment has been ordered for the Coffield & Guthrie 1 E. M. Conrad, Borden County wildcat, 7 miles northwest of the Sharon Ridge pool in southern Scurry County. The test had been shut down at 3,874 ft., total depth, because of 3,000 ft. of water in the hole from 3,520-40 ft. A slight gas show was noted in drilling at 3,700-15 ft.

Location of 1 Conrad is SE NW Section 79, Block 20, Lavaca Navigation Co. Survey.

NORTHERN WEST TEXAS COMPLETIONS

(24-hr. ratings based on last 3 hr. of 6-hr. gage)

Wildcats

Borden County: Coffield & Guthrie 1 Conrad, SE NW Sec. 79, Blk. 20, Lavaca Navigation Co. Sur., elev. 2,321 ft., top San Andres 3,080 ft., dry at 3,874 ft.

Fields

Emma, Andrews County: Atlantic and Sun 1-C Holt, elev. 3,127 ft., 354 bbl., 270-qt. shot, 4,425-4,515 ft.

Dockery Robbins, Mitchell County: M. W. Fentress 1 Strain, elev. 2,239 ft., 96 bbl., 2 per cent water, 520-qt. shot, 1,615-1,715 ft., P.B. from 1,751 ft.

Slaughter, Cochran County: Devonian Oil 1 Woodley, elev. 3,660 ft., 755 bbl., 12,500 gal. acid, 4,914-68 ft.

Magnolia 11 Woodley, elev. 3,651 ft., 977 bbl., 3-in. casing outlet, 10,500 gal. acid, 4,925-76 ft.

Slaughter, Hockley County: Magnolia 4-C Mallett, elev. 3,626 ft., 1,496 bbl., 3-in. casing outlet, 10,500 gal. acid, 4,975-5,040 ft.

Magnolia 4-F Mallett, elev. 3,610 ft., 1,609 bbl., 3-in. casing outlet, 10,500 gal. acid, 4,959-5,020 ft.

Magnolia 8-J Mallett, elev. 3,611 ft., 1,397 bbl., 3-in. casing outlet, 4,990-5,030 ft.

Magnolia 10-J Mallett, elev. 3,622 ft., 1,285 bbl., 10,500 gal. acid, 4,987-5,035 ft.

Milhoan 2 Fannin-Slaughter, elev. 3,592 ft., 218 bbl., 1⅝-in. choke, 12,250 gal. acid, 4,856-4,968 ft.

W. J. Richardson 1 Peck, elev. 3,571 ft., 364 bbl., 7,500 gal. acid, 4,870-4,982 ft.

Rowan Drlg. 2 Mallett, elev. 3,579 ft., 1,080 bbl., 10,000 gal. acid, 4,928-5,009 ft.

Stanolind 30-E Slaughter, elev. 3,542 ft., 745 bbl., 2-in. casing outlet, 8,500 gal. acid, 4,885-4,995 ft.

Texas 9-E Mallett, elev. 3,621 ft., 1,184 bbl., 11,500 gal. acid, 4,955-5,044 ft.

Texas 11-E Mallett, elev. 3,615 ft., 1,548 ft., 10,000 gal. acid, 4,985-5,037 ft.

Texas 25 Slaughter, elev. 3,557 ft., 723 bbl., 9,000 gal. acid, 4,930-90 ft.

Texas 28 Slaughter, elev. 3,556 ft., 919 bbl., 10,500 gal. acid, 4,980-5,020 ft.

T. P. Coal & Oil 1-B Mallett, elev. 3,616 ft., 797 bbl., 10,000 gal. acid, 4,950-5,027 ft.

Wasson, Gaines County: Amerada 6 Austin, elev. 3,325 ft., 640 bbl., ½-in. choke, 168-qt. shot, 5,128-5,240 ft.

Wasson, Yoakum County: Denver 2 Whittenberg, elev. 3,623 ft., old well drilled deeper, old T.D. 5,098 ft., 960 bbl., T.D. 5,170 ft.

Red Lakes Pool Extended And Two Edge Tests Staked

HOBBS, N. M., Sept. 15.—The Red Lakes pool of Eddy County attracted chief interest among Southeast New Mexico developments as it gained location for a pair of extension tests and was widened ⅝ mile southwest by a producer.

The extension producer is E. L. Fulton 1 State, 330 ft. out of the northeast corner of 36-17s-27e. One a 24-hour pumping test it made 43 bbl. of 37.2-gravity oil. The well topped pay at 509 ft. and is bottomed at 528 ft. in sandy lime. It was acidized with 2,000 gal. in stages of 1,000 gal. each.

Extending the Maljamar pool a short distance north, Brewer Drilling Co. completed 1-B Mitchell for daily flow of 132 bbl. through ½-in. choke on 2-in. tubing set at 3,669 ft. The well was shot with 70 qt. in pay zone from 3,641 ft., total depth. It is located 660 ft. out of the southwest corner of 18-17s-32e.

Maljamar 10-B Mitchell, 660 ft. out of the southeast corner of 19-17s-32e, flowed 240 bbl. per day through open 2-in. tubing swung at 3,800 ft. The well topped pay at 3,730 ft., is bottomed at 3,840 ft. in lime and was shot with 210 qt. from 3,730-3,835 ft.

Another Maljamar well, Carper Drilling Co. 8-N Simon, was completed at 4,001 ft. in sand and lime for flow of 150 bbl. a day through open 2-in. tubing set at 3,860 ft. It was gaged following a 280-qt. shot from 3,850-3,990 ft. Pay zone was entered at 3,845 ft.

TEXAS PANHANDLE

AMARILLO, Tex., Sept. 15.—Recovering from last week's slack period the Panhandle district announced the completion of 23 wells with only 1 dry. The 22 producers had a total daily potential of 3,611 bbl. Outstanding completion of the week was the Stanolind 5 Moore, Section 21, Block M-21, T.C. Survey, which pumped 459 bbl. on Railroad Commission test.

New locations in the field were higher than usual this week. Of the 35 new tests staked Phillips Petroleum Co. accounted for 21, 3 of which are in the big gas area of Moore County. The rest were scattered through Gray, Hutchinson, Moore and Wheeler counties.

PANHANDLE COMPLETIONS

Carson County: Danciger 7 Block, 112-4 I.&G.N. Sur., pumped 257 bbl. from 3,055-8,120 ft., T.D. 3,140 ft.

Gray County: Bell 3 Webb-D, 61-25 H.&G.N. Sur., pumped 59 bbl. from 2,486-2,500 ft., T.D. 2,505 ft.

Taylor 7 Taylor-B, 24-B-2 H.&G.N. Sur., pumped 65 bbl. from 2,795-2,893 ft., T.D. 2,893 ft.

Drilling & Exploration 5 Henry, 114-3 I.&G.N. Sur., dry at 3,290 ft.

Garber & Fagan 2 Lovett, 25-B-2, H.&G.N. Sur., pumped 27 bbl., 2,850-2,925 ft., T.D. 2,925 ft.

Magnolia 2 Wright, 13-3 I.&G.N. Sur., deepened to 3,034 ft., pumped 39 bbl.

Phillips 2 Swanson, 87-B-2, H.&G.N. Sur., 263 bbl. from 2,977-3,098 ft., T.D. 3,118 ft.

Taylor 3 fee, 24-B-2 H.&G.N. Sur., pumped 57 bbl. from 2,868-2,970 ft., T.D. 2,970 ft.

Texas 14 Harrah, 150-3 I.&G.N. Sur., pumped 249 bbl. from 3,180-3,245 ft., T.D. 3,270 ft.

Texas 26 Williams, 7-1 A.C.H.&B. Sur., 247 bbl. from 2,600-2,780 ft., T.D. 2,780 ft.

Hutchinson County: Crosbie 42 Pitts, 42-B-21 T.C.R.R. Sur., pumped 295 bbl. from 2,755-2,875 ft., T.D. 2,895 ft.

Danube 2 Stafford, 78-46 H.&T.C. Sur., pumped 240 bbl. from 2,780-2,815 ft., T.D. 2,815 ft.

(Continued on Page 248)

Cary Field Discovery Well Still in Testing Stage

JACKSON, Miss., Sept. 15.—Mississippi's third oil discovery is still in the testing stages. It is British American Oil 1-A Houston, C N½ NE SW 23-11n-7w, discovery well for the Cary field. The 10¾-in. casing is set at 713 ft. and the 7⅝-in. at 3,278 ft. At a total depth of 4,355 ft. an electrical survey was made and casing was perforated from 3,278-85 ft., squeezed and drilled out to 3,280 ft. On a 4-day pumping period with actual pumping only 8 hours each day, the well made a total of 156 bbl. of oil and 350 bbl. of water. Testing is still under way. Production is from the chalk topped at 3,270-80 ft.

New Wildcat Operations

Yazoo County Mississippi and Lauderdale County, Alabama, were both given new wildcat operations the past week. In Yazoo County Kirby Petroleum and Woodley Petroleum have staked 1 State, SE SE NE 16-10n-3w, 1¾ miles west of production in the Tinsley field.

In Lauderdale County, Alabama, Buford Fillingame has made location and is rigging up spudder for 1 Mecke, located in the SE cor. 20-1s-10w. Contract depth was not given.

Alabama's most closely watched operation is in Clarke County and is Union Oil 1 Waite, C NW 27-8n-1w. With an elevation of 82 ft., the 16-in. casing was set at 344 ft., top of the chalk was reported at 1,660 ft., and at 5,257 ft. the 10¾-in. casing was cemented. At last reports the well was drilling below 11,426 ft. Tanks were set at the well several weeks ago when shows were drilled in three different zones, and should production fail at its ultimate total depth, thorough testing will be made by plugging back up the hole.

(Continued on Page 253)

Southwest Texas Fields

(Continued from Page 243)

Agua Dulce, Nueces County: Seaboard 1 Robert Kleberg, 162 bbl., 7/64-in. choke, perf. casing 7,057-62 ft., 7,066 ft.

Midway, San Patricio County: British American Oil Co. 4 Ivey, 125 bbl., 7/64-in. choke, perf. casing 6,053-55 ft., T.D. 6,125 ft.

Gibson Oil Co. 6 Floerke, 5 bbl. oil and 2,000,000 cu. ft. gas, ¼-in. choke, perf. casing 5,300-04 ft., T.D. 5,344 ft.

Fields

Refugio County: Hewitt & Dougherty 1 Emma Huddleson, dry, T.D. 7,070 ft.

LEGAL

United States Department of the Interior, District Land Office, Las Cruces, New Mexico. Notice is hereby given that a lease of the oil and gas deposits in the following described lands is offered to the responsible qualified bidder of the highest bonus per acre, pursuant to the provisions of Section 17 of the act of February 25, 1920 (41 Stat. 437) as amended, at the royalty rate scale in the lease forms shown in General Land Office Circular 1386, at a sale to be held in the office of the Register of the District Land Office at Las Cruces, New Mexico, at 10:00 A.M. on October 1, 1941: E½ NE¼ Sec. 27, T. 17 S., R. 30 E., N.M.P.M., New Mexico, containing 80 acres in the Jackson Oil and Gas Field. The successful bidder must deposit on the date of sale a certified check on a solvent bank, or cash, of one-fourth of the amount of the bid and file a showing of qualifications to receive the lease, required by Section 7 of Circular 1386. The remaining three-fourths, together with the annual rental in advance at the rate of $1.00 per acre must be paid, and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. The bidders are warned against violation of the provisions of Section 59 of the Criminal Code, approved March 4, 1909, prohibiting unlawful combinations or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. Register.

Jack Thurman 1 State, 104 bbl., ¼-in. choke, perf. casing 6,312-20 ft., T.D. 6,451 ft.

Shield, Nueces County: Shield 2-A Moore, 132 bbl., ⅛-in. choke, perf. casing 6,602-09 ft., T.D. 6,611 ft.

Tom O'Connor, Refugio County: Quintana 20 Heard, 670 bbl., ⅛-in. choke, perf. casing 5,864-74 ft., T.D. 5,925 ft.

LAREDO DISTRICT

Wildcats

Duval County: Henderson Coquat 2-C Southland Life Ins. Co., dry, T.D. 5,113 ft.

Greer & Palmer 1 E. A. Parr, dry, T.D. 5,411 ft.

Hidalgo County: W. R. Davis 1 Dowley, dry, T.D. 6,520 ft.

Jim Hogg County: Plymouth 2 Sweeney, dry, T.D. 5,700 ft.

Live Oak County: Holland Douglas & Smith 1 Hinton, dry, T.D. 2,812 ft.

Edwin M. Jones 3-B West, dry, T.D. 9,733 ft.

Webb County: D. J. Moss 1 Pryor, dry, T.D. 1,760 ft.

Upton Lee 2 Garcia Villareal, dry, T.D. 2,182 ft.

Union Oil Co. of California 1 Volpe, dry, T.D. 7,018 ft.

Fields

Alta Mesa, Brooks County: Standard Oil Co. of Texas 16 Mestena O. & G. Co., 78 bbl., pumping, T.D. 3,020 ft.

Colorado, Jim Hogg County: C. Andrade 4-E Trevino, 115 bbl., ¼-in. choke, sand 2,916-22 ft., T.D. 2,932 ft.

V. F. Neuhaus 3-D Trevino, 216 bbl., ¼-in. choke, sand 2,939-48 ft., T.D. 2,948 ft.

Holbein, Jim Hogg County: H. R. Smith 1 Stroman-Armstrong, 60 bbl., pumping, T.D. 2,839 ft.

Kelsey, Brooks County: San Patricio Oil Co. 1 Marshall, 79 bbl. oil plus 8 bbl. salt water, ¼-in. choke, T.D. 5,050 ft.

Killam, Webb County: Anderson & Killam 1 Garcia-Villareal, gas well, T.D. 2,524 ft.

O. W. Killam 13 Villareal, 75 bbl. oil, pumping, perf. casing 1,992-96 ft., T.D. 2,025 ft.

Lundell, Duval County: Government Wells 54 Lundell, 24 bbl. oil, 14 hr., ⅜-in. choke, T.D. 1,547 ft.

McAllen, Hidalgo County: W. R. Davis 1 Arizona-Texas Citrus Co., 344 bbl. distillate, open flow, perf. casing 7,520-50 ft., T.D. 8,513 ft.

Rincon, Starr County: Continental 109-A Slick, 143 bbl., ⅞-in. choke, perf. casing 4,149-63 ft., T.D. 4,265 ft.

Continental 90-B Slick, 106 bbl., ⅞-in. choke, perf. casing 3,981-4,001 ft., T.D. 4,175 ft.

Continental 72-H Slick, 81 bbl. oil and 8 bbl. salt water, jetting, T.D. 4,250 ft.

Tesoro, Duval County: F. J. Gravis 1 L. L. Loving, dry, T.D. 5,764 ft.

SOUTH CENTRAL TEXAS DISTRICT

Wildcats

Bastrop County: John F. Camp & Sons 1 Bailey, dry, T.D. 2,401 ft.

La Salle County: McCurdy et al 1 Cartwright, dry, T.D. 3,513 ft.

Fields

Gas Ridge, Bexar County: Ridge Gas & Oil Co. 32 Hamilton-Swain, dry, T.D. 451 ft.

Pearsall, Frio County: Falcon-Seaboard and Dunwoody 2 Halff & Oppenheimer, 95 bbl., ¼-in. choke, perf. casing 3,916-26 ft., T.D. 4,326 ft.

Tenney Creek, Caldwell County: Ellmag Oil Corp. 2-C Connelly, 408 bbl., ¼-in. choke, T.D. 2,464 ft.

LEGAL

Department of the Interior, United States Land Office, Las Cruces, New Mexico. Notice is hereby given that lots 8 and 9, Sec. 5, T. 21 S., R. 37 E., N.M.M., New Mexico, containing 80 acres in the Eunice Field, New Mexico, are offered to the responsible qualified bidder of the highest bonus per acre for lease under section 17 of the act of August 21, 1935 (49 Stat. 674), at the royalty rate scale in the lease form shown in Circular 1386 at a sale to be held in the United States Land Office, Las Cruces, New Mexico at 10:00 o'clock October 1, 1941. The successful bidder must deposit on the date of the sale a certified check on a solvent bank, or cash, for 1/5 of the mount bid, and file the showing of qualifications to receive a lease, required by section 7 of Circular 1386. The remainder of the bonus bid and the annual rental of $1.00 per acre must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. The bidders are warned against violation of the provisions of Sec. 59 of the United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. Paul A. Roach, Register.

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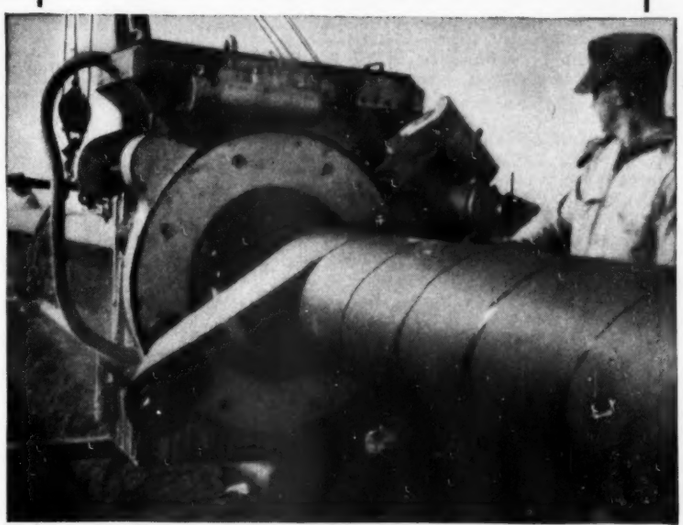

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ASBESTOS PIPE-LINE FELTS

Devonian Discovery Near Carlyle Makes Good Flow

By STAFF CORRESPONDENT

CLINTON County's Devonian discovery was not yet completed at the end of the week following an unexpected flow of 250 bbl. of oil and 140 bbl. of water in 11 hours, together with an estimated 40,000,000 cu. ft. of gas. The discovery well, Texas 1 Price Gray, S½ NW SE 35-3n-2w, is the first well in the state to find important Devonian production in an area where there are no proven shallower pays. Saturation was reported in the Benoist at 1,200-25 ft., but was passed up.

Texas 1 Gray found Devonian saturation from 2,619-84 ft. With an elevation of 427 ft., it topped the Glen Dean at 895 ft., Cypress at 1,075 ft., Benoist at 1,197 ft., Ste. Genevieve at 1,330 ft., Salem at 1,457 ft. and Devonian at 2,570 ft.

Casing was set to the bottom of the hole at 2,684 ft., and on bailing out, the well flowed around the shoe necessitating another cement job.

Cypress Pay Found Southeast Of Sailor Springs Pool

Williams 1 Schnautz, NW NE SW 35-4n-7e, about 1 mile southeast of the Sailor Springs field, reported 12 ft. of saturation in Cypress sand at 2,601-13 ft. Some small production has been found in the Cypress in the field, but the main pay is Tar Springs sand and the Cypress possibilities were not highly regarded. This new find, however, makes the lower pay look more favorable.

WILDCAT COMPLETIONS

Clay County: R. E. Hannin 1 Newton, SW SE SW SE 18-3n-5e, dry at 2,896 ft.. Cypress sand 2,487 ft., Ste. Genevieve 2,767 ft., Fredonia 2,830 ft.

Jefferson County: A. W. Hutchins et al 1 M. S. Gilman, NW NW NW 18-3s-2e, dry at 1,947 ft., Menard 1,695 ft., Waltersburg 1,745 ft., Tar Springs 1,818 ft., Glen Dean 1,933 ft.

Morgan County: Magnolia 1 J. B. Keplinger, SW SW SE 28-13n-8w, dry at 1,765 ft., base Pennsylvanian 385 ft., Osage 646 ft., Keokuk 727 ft., Kinderhook 962 ft., Chattanooga 1,045 ft., Devonian 1,176 ft., Silurian 1,198 ft., Maquoketa 1,405 ft., Trenton 1,585 ft.

Washington County: Bill Lee 1 Leibrock, SW SW NW 21-2s-3w, location abandoned.

Richardson 1 Kasten, SW SW SW 27-1n-2w, dry at 1,611 ft., Tar Springs 957 ft., Glen Dean 1,028 ft. Golconda 1,065 ft., Barlow 1,162 ft., Cypress sand 1,194 ft., Benoist 1,336 ft., Aux Vases 1,404 ft., Ste. Genevieve 1,493 ft., Rosiclare 1,510 ft., Fredonia 1,553 ft., St. Louis 1,610 ft.

Wayne County: Pioneer Drilling and Witcher 1 Williams, S½ SW NE 22-1n-6e, flowed 1,200 bbl., 5,000 gal. acid, McClosky 3,168-69 ft., 3,172-77 ft., T.D. 3,187 ft. *Extends Johnsonville pool 1 mile north.*

White County: W. F. Catlett 1 Calvert, SE SE NW 32-5s-10e, pumped 90 bbl., 4-qt. shot in Palestine, ripped casing 2,099-2,108 ft.. Palestine 2,099-2,113 ft., T.D. 3,148 ft., P.B. 2,188 ft. *Pool opener.*

Yingling et al 1 Shepard, NE NE NE 5-4s-10e, pumped 74 bbl., 20-qt. shot 2,915-25 ft., Cypress sand 2,908-25 ft., T.D. 3,187 ft., P.B. 2,925 ft. *Pool opener.*

FIELD COMPLETIONS

Clark County

Westfield: G. P. Haley 1 Young-Miller, SW NW NW 29-11n-14w, dry at 345 ft., sand 312-17 ft.

Clay County

Clay City: Pure 4 Holman A, E½ SE NW 15-2n-8e, pumped 45 bbl. oil and 75 bbl. water, 5,000 gal. acid, McClosky 3,021-30 ft., 3,033-37 ft., T.D. 3,055 ft.

Pure 13 L. Clark, W½ SE NW 8-2n-8e, pumped 160 bbl., natural, Cypress sand 2,650 ft., T.D. 3,070 ft., P.B. 2,681 ft.

Pure 14 Sol Smith B, NW SW SE 7-2n-8e, pumped 24 bbl., Cypress sand 2,655-67 ft., T.D. 2,667 ft.

Sailor Springs: C. Robinson 9 Tolliver, NE NW SE 26-4n-7e, pumped 100 bbl., 20-qt. shot 2,322-32 ft., Tar Springs 2,314 ft., pay 2,316 ft., T.D. 2,334 ft.

Edwards County

Albion: Magnolia 3 F. J. Fewkes, NE SW SW 7-2s-11e, pumped 190 bbl., 2,000 gal. acid, reacidized 2,000 gal., perf. 3,090-3,100 ft., McClosky 3,175-85 ft., T.D. 3,185 ft.

Effingham County

Mason: Gardner Bros. 1 Schottman, N½ NE SW SW 27-6n-5e, pumped 50 bbl. oil and 50 bbl. water, 20-qt. shot 2,266-72 ft., Benoist 2,263 ft., T.D. 2,276 ft.

Fayette County

Louden: Carter 8-D J. B. Brees, W½ NW NW 22-8n-3e, flowed 200 bbl., 10 per cent water, perf. 3,058-61 ft. in Devonian, T.D. 3,096 ft., P.B. 3,076 ft.

Carter 5-D L. Weaver, W½ NW NW 28-8n-3e, flowed 200 bbl., ½-in. choke, perf. 3,022-24 ft., Devonian 2,918 ft., pay 3,003 ft., T.D. 3,036 ft.

Carter 4-D Presbyterian Church, W½ SE NE 21-8n-3e, flowed 200 bbl. oil and 40 bbl. water, ½-in. choke, perf. 3,166-70 ft., 3,166-87 ft., 100 gal. acid, reacidized 250 gal., perf. 3,159-62 ft., 3,142-46 ft., Devonian 3,064 ft., pay 3,149 ft., T.D. 3,197 ft., P.B. 3,163 ft.

Carter 5-D Mary Cummings, E½ NE NE 21-8n-3e, flowed 200 bbl., perf. 3,080-86 ft., Devonian 3,000 ft., pay 3,087 ft., T.D. 3,141 ft., P.B. 3,095 ft.

Carter 15-D Wright, E½ SE SE 20-8n-3e, flowed 200 bbl., perf. 3,063-65 ft., Devonian 3,003 ft., pay 3,083 ft., T.D. 3,088 ft.

Carter 3 G. Ashburn, NE SW NE 4-7n-3e, pumped 10 bbl. oil and 3 bbl. water, 10-qt. shot 1,583-87 ft., 20-qt. shot 1,519-25 ft., Paint Creek stray 1,583 ft., Cypress sand 1,502 ft., T.D. 1,588 ft.

Carter 5-D M. Dunnaway, E½ NE SE 29-8n-3e, flowed 200 bbl., ⅝-in. choke, perf. 3,063-65 ft., Devonian 2,970 ft., pay 3,055 ft., T.D. 3,078 ft.

Carter 2-1 Buzzard, SW SW SW SW 35-9n-3e, gas input well, Glen Dean 1,326 ft., Cypress 1,459 ft., Cypress sand 1,497 ft., T.D. 1,525 ft.

Franklin County

Thompsonville: Benedum-Trees 1 Liles, SE NW SE 34-7s-4e, pumped 165 bbl., 1,000 gal. acid, McClosky 3,132 ft., T.D. 3,154 ft.

Gallatin County

Inman: Carter 3 J. H. Curry, NW NE NW 15-8s-10e, dry at 2,106 ft., P.B. 1,860 ft., lower Kincaid 1,65[illegible] ft., Palestine 1,817 ft., Menard 1,904 ft., Vienna 2,038 ft., Tar Springs 2,070 ft.

Hamilton County

Dale: Shell 5 Ritcheson et al, SE SW NE 7-6s-7e pumped 17 bbl., 65-qt. shot 2,987-97 ft., Aux Vases 2,960 ft., T.D. 3,006 ft.

Pure 3 Fairweather A, NW NW SW 7-6s-7e, flowed 618 bbl., 210-qt. shot 3,014-45 ft., Aux Vases 3,009 ft., T.D. 3,045 ft.

Pure 14 E. Cuppy, SE NE SW 6-6s-7e, flowed 330 bbl., 210-qt. shot 2,963-95 ft., Aux Vases 2,955-95 ft., T.D. 2,995 ft.

Kingwood 6 Dodd, NE SE NW 6-6s-7e, flowed 53 bbl. in 6 hr., 60-qt. shot 2,983-3,104 ft., Aux Vases 2,976 ft., T.D. 3,014 ft.

Hoodville: Shell 2-A Porter, NE SW SE 34-5s-6e pumped 10 bbl. oil and 6 bbl. water, 10-qt. shot 3,054-61 ft., Aux Vases sand 3,042-46 ft., 3,048-61 ft., T.D. 3,061 ft.

Barden: Kewanee Oil 1 Flannagan, NE SW NE 14-6s-5e, flowed 559 bbl., natural, Aux Vases 3,157 ft., pay 3,159-73 ft., T.D. 3,173 ft.

Shell 1 T. Lockwood, SW NW NW 13-6s-5e, pumped 19 bbl. oil and 2 bbl. water, 36-qt. shot 3,203-09 ft., Aux Vases 3,177 ft., Ste. Genevieve 3,209 ft., T.D. 3,213 ft.

Reward Oil 1 Anderson, SW SW SW 12-6s-5e, flowed 1,070 bbl., natural, Aux Vases sand 3,170 ft., T.D. 3,193 ft.

Jasper County

North Boos: Pure 10 J. Bergbower A, SW SW SE 5-6n-10e, flowed 726 bbl., 5,000 gal. acid, McClosky 2,759-63 ft., 2,768-77 ft., T.D. 2,785 ft.

West Liberty: Pure 2 E. Musgrove, E½ NW SE 20-5n-10e, pumped 37 bbl., 5,000 gal. acid, McClosky 2,792-2,800 ft., T.D. 2,825 ft.

Jefferson County

South Woodlawn: Magnolia 3 J. Eubanks, NW NW NW 1-3s-1e, pumped 576 bbl., 80-qt. shot 1,948-80 ft., Benoist 1,934 ft., T.D. 1,980 ft.

E. M. Self 2 Zinke, SE SW NW 35-2s-1e, pumped 250 bbl., Benoist 1,973 ft., T.D. 1,977 ft.

Kingwood 7 Woodlawn, SW SE NW 35-2s-1e, pumped 300 bbl., 30-qt. shot 1,953-68 ft., Benoist 1,953 ft., T.D. 1,968 ft.

Magnolia 7 Eubanks, SE SE SE 35-2s-1e, pumped 636 bbl., 60-qt. shot 1,957-81 ft., Benoist 1,942 ft., T.D. 1,981 ft.

Magnolia 5 Shirley, NW NE SE 35-2s-1e, pumped 648 bbl., 40-qt. shot 1,964-77 ft., Benoist 1,956 ft., T.D. 1,977 ft.

Magnolia 6 Shirley, SE NE SE 35-2s-1e, pumped 792 bbl., 50-qt. shot 1,964-80 ft., Benoist 1,953 ft., T.D. 1,980 ft.

Magnolia 7 Shirley, NW SE NE 35-2s-1e, pumped 424 bbl., 20-qt. shot 1,988-93 ft., Benoist 1,979 ft., T.D. 1,993 ft.

Ruwaldt et al 2 Winesburgh, NE SW SE 35-2s-1e, pumped 610 bbl., 36-qt. shot 1,945-48 ft., Benoist 1,920 ft., T.D. 1,948 ft.

Ruwaldt et al 4 Winesburgh, SE SW SE 35-2s-1e pumped 580 bbl., 35-qt. shot 1,925-43 ft., Benoist 1,911 ft., T.D. 1,943 ft.

E. M. Self 2 Filbreth, NW NW SW 35-2s-1e, pumped 425 bbl., 40-qt. shot 1,982-92 ft., Benoist 1,976 ft., T.D. 1,992 ft.

Shell 3 Burkhardt, NW SW NE 35-2s-1e, pumped 175 bbl., 10-qt. shot 1,984-91 ft., Benoist 1,966 ft., pay 1,975-91 ft., T.D. 1,991 ft.

Ruwaldt 2 Rynski, SE SW NW NW 35-2s-1e, location abandoned.

Ruwaldt & Bayer 1 Rynski, SE SE NW NW 35-2s-1e, location abandoned.

Marion County

East Patoka: Shell 8-A Davidson, SE SE NE 34-4n-1e pumped 50 bbl. oil and 56 bbl. water, 1-qt. shot 1,470-71 ft.. Benoist sand 1,465-71 ft., T.D. 1,471 ft.

Salem: Texas 4 L. Maxwell A, NW SE NE 31-2n-2e, flowed 75 bbl., natural, Trenton 4,465 ft., old well deepened from 3,350-4,584 ft.

Richland County

Parkersburg: Sinclair 1 Clodfelter, NE NE SW 29-2n-14w, flowed 1,968 bbl. 7,000 gal. acid, McClosky 3,116-31 ft., T.D. 3,131 ft.

Nelson Dev. 1 Clodfelter, S½ SW NE 29-2n-14w, dry at 3,135 ft., West Franklin 720 ft., Menard 2,291 ft., Glen Dean 2,538 ft., Golconda 2,618 ft., Cypress sand 2,797 ft., Paint Creek 2,883 ft., Benoist 2,967 ft., Renault 2,996 ft., Aux Vases 3,030 ft., Ste. Genevieve 3,072 ft., McClosky 3,118 ft.

Dundas: Pure 1 M. B. Elliott, W½ SW SW 29-5n-10e, pumped 286 bbl., 5,000 gal. acid, McClosky 2,838-42 ft., 2,850-52 ft., T.D. 2,870 ft.

Pure 2 D. W. Delzell, W½ NE SE 30-5n-10e, dry at 2,850 ft., Glen Dean 2,289 ft., Benoist 2,430 ft., Cypress 2,447 ft., Aux Vases 2,746-52 ft., Ste. Genevieve 2,769 ft., Rosiclare 2,785 ft., Fredonia 2,808 ft.

Wabash County

Mount Carmel: E. O. Olds 1 City School, N½ SE SW 21-1s-12w, location abandoned.

Olds & McNeal 4 Riverside Park, NW NW SE 21-1s-12w, pumped 100 bbl., 30-qt. shot 1,981-90 ft., Cypress sand 1,979-90 ft., T.D. 1,990 ft.

First Nat. Pet. Trust 1 Samuels B, NE SW NW 21-1s-12w, pumped 75 bbl., 40-qt. shot 1,512-24 ft., 84-qt. shot 1,545-52 ft., Biehl 1,512-23 ft., 1,536-52 ft., T.D. 2,065 ft.

W. Ballor 2 Goodart, SE SW NW 21-1s-12w, pumped 170 bbl., 150-qt. shot 1,440-81 ft., Biehl 1,436-58 ft., 1,473-81 ft., T.D. 1,485 ft.

Allendale: White & Wickwire 1 C. C. C. & St. Louis R. R., SW SW SE NW 14-1n-12w, location abandoned.

Griffin: W. W. Gray 15 fee A, SW SE NW 14-3s-14w, flowed 200 bbl., 40-qt. shot 2,513-50 ft., Cypress 2,513-23 ft., 2,533-50 ft., T.D. 2,550 ft.

Wayne County

Johnsonville: Curtiss & Brown 1 R. Watson, S½ SW NW 26-1n-6e, flowed 1,728 bbl., 1,000 gal. acid, reacidized 4,000 gal., McClosky 3,115-25 ft., T.D. 3,134 ft.

Texas 3 M. Watson, S½ SW SW 26-1n-6e, flowed 373 bbl. in 17 hr., 1,000 gal. acid, reacidized 5,000 gal., McClosky 3,081-87 ft., 3,095-97 ft., 3,099-3,103 ft., T.D. 3,111 ft.

United Prod. 3 H. E. Matchett, S½ NW SE 27-1n-6e, flowed 200 bbl., 1,000 gal. acid, reacidized 3,000 gal., McClosky 3,023-26 ft., 3,052-61 ft., T.D 3,070 ft.

United Prod. 4 Matchett, N½ NW SE 27-1n-6e, flowed 1,584 bbl., McClosky 3,030-37 ft., 3,042-52 ft., T.D. 3,073 ft.

Wiser 4 Hillard, N½ NE SW 27-1n-6e, flowed 415 bbl., 1,000 gal. acid, reacidized 5,000 gal., McClosky 2,997-3,001 ft., 3,004-10 ft., 3,013-14 ft., T.D. 3,103 ft.

Wiser 2 Matchett, S½ SE NE 27-1n-6e, flowed 2,297 bbl., McClosky 3,072-81 ft., 3,084-86 ft., T.D. 3,126 ft.

Shell 1 McReynolds, N½ NE NE 33-1n-6e, flowed 3,301 bbl., 5,000 gal. acid, McClosky 3,084-88 ft., 3,093-96 ft., 3,098-3,110 ft., T.D. 3,115 ft.

Ill. Prod. Corp. 2 Shreve, S½ SW NW 34-1n-6e, flowed 1,000 bbl., 2,000 gal. acid, perf. 3,088-95 ft., 3,091-3,108 ft., McClosky 3,088-3,106 ft., T.D. 3,118 ft.

Shell 3 Turner Comm., N½ NW NW 34-1n-6e, flowed 3,067 bbl., 5,000 gal. acid, McClosky 3,042-45 ft., 3,047-65 ft., T.D. 3,073 ft.

United Prod. 1-A Carriers, S½ SW NE 34-1n-6e, pumped 125 bbl., 5,000 gal. acid, perf. 3,088-93 ft., 3,098-3,103 ft., McClosky 3,089-3,103 ft., T.D. 3,150 ft.

United Prod. 2-A Carriers, N½ NW NE 34-1n-6e pumped 125 bbl., perf. 3,044-52 ft., 1,000 gal. acid, McClosky 3,091-94 ft., 3,130-35 ft., no show oil in McClosky, Ste. Genevieve 3,036 ft., saturation 3,046-51 ft., T.D. 3,162 ft.

United Prod. 4 S. M. Schell, S½ SE NE 34-1n-6e, flowed 1,657 bbl. in 20 hr., natural, McClosky 3,088-3,100 ft., T.D. 3,125 ft.

Wiser 6 A. A. Watson, S½ NE NE 34-1n-6e, flowed 1,836 bbl., perf. 3,082-96 ft., McClosky 3,089-96 ft., 3,101-10 ft., T.D. 3,119 ft.

Texas 7 Leathers, S½ SW NW 27-1n-6e, flowed 860 bbl., 4,000 gal. acid, McClosky 3,047-52 ft., 3,055-60 ft., 3,073-83 ft., T.D. 3,091 ft.

United Prod. 2 A. A. Watson, S½ NW NW 35-1n-6e, flowed 342 bbl., 5,000 gal. acid, McClosky 3,107-11 ft., 3,123-30 ft., T.D. 3,149 ft.

Olson Oil 1 Porter, W½ NW SE 36-1n-6e, flowed 508 bbl., 2,500 gal. acid, McClosky 3,213-18 ft., old well deepened from 3,207-40 ft.

West Enterprise: Pure 1 Barth-Carson Consol., E½ SE SE 2-1n-7e, pumped 55 bbl., 5,000 gal. acid, McClosky 2,998-3,000 ft.. 3,002-05 ft., T.D. 3,035 ft.

White County

Mill Shoals: Weinert 6 Miller Bros. & Anderson, NW SE NE 30-3s-8e, flowed 200 bbl., 50-qt. shot 3,206-19 ft., Aux Vases sand 3,198 ft., T.D. 3,230 ft.

Storms: Sinclair 14 Rudolph, NW SE SW 12-6s-9e, pumped 116 bbl., 10-qt. shot 2,271-75 ft., Waltersburg sand 2,254 ft., T.D. 2,275 ft.

North New Harmony: Superior 13 H. C. Ford D, SW NE NW 34-4s-14w, pumped 80 bbl., perf. 2,572-2,605 ft., 110-qt. shot 2,807-34 ft., Cypress sand 2,576-2,628 ft., Aux Vases 2,710-35 ft., T.D. 2,836 ft.

Sun 34 Greathouse, SE NW SE 33-4s-14w, pumped 250 bbl., 60-qt. shot 2,695-2,731 ft., Benoist 2,668 ft., saturation 2,689-2,731 ft., T.D. 2,731 ft.

Superior 25 E. M. Fitten, NW NE NE 28-4s-14w, pumped 200 bbl., 100-qt. shot 2,836-60 ft., Aux Vases 2,835-57 ft., T.D. 2,860 ft.

Sun and Ellis 4 Jacobs B, SW NW SW 28-4s-14w, pumped 103 bbl., 70-qt. shot 2,696-2,721 ft., Benoist 2,682-90 ft., 2,708-23 ft., T.D. 2,723 ft.

Sun and Ellis 10 Jacobs A, S½ S½ N½ 28-4s-14w, pumped 37 bbl., 60-qt. shot 2,834-58 ft., Aux Vases sand 2,839-58 ft., T.D. 2,858 ft.

Sun and Ellis 6 Jacobs A, SW SE NW 28-4s-14w, pumped 35 bbl., 30-qt. shot 2,590-2,600 ft., Cypress sand 2,591 ft., T.D. 2,851 ft., P.B. 2,605 ft.

East Calvin: Yingling & Schuler 2 Smith, NW SE SW 5-4s-14w, pumped 15 bbl. oil and 15 bbl. water, perf. 3,006-10 ft., McClosky 3,006-10 ft., 3,034-46 ft., T.D. 3,051 ft., P.B. 3,020 ft.

(Continued on Page 248)

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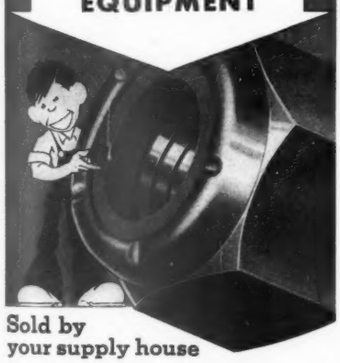

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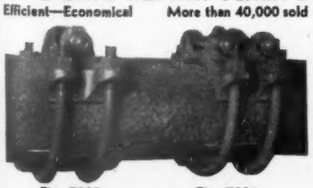

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MICHIGAN OPERATIONS

Bay County Well Ready for Salina Gas Production

By OTTO C. PRESSPRICH

SAGINAW, Mich., Sept. 15.—Gulf Refining Co. perforated casing in its plugged-back Bateson deep test in Bay County last Thursday and was burning the vented-off gas while control heads were being placed. The gas blew out the hole several hours after the perforating. No effort was made to gage the flow of gas, but the pillar of burning gas flared to a height of about 75 ft. The gas zone is around 7,800 ft. and Gulf hopes to salvage the wet gas which yields a highly volatile gasoline after the expensive testing which carried the hole to over 10,000 ft. into St. Peter limestone in an unsuccessful search for oil.

In the vicinity of the Eugene Hilliard wildcat, in Roscommon County, Pure Oil was nearing Dundee formation below 3,600 ft. after missing the Traverse pay from which the Hilliard Roscommon Township well in Section 34 continues to produce heavily after 3 months. The Pure test is ¼ mile east of the Hilliard well. Such spotty conditions are common in Michigan Traverse tests. Five other wells are drilling in the area.

While there were no new completions recorded last week for the Reed City field, a half-dozen were at the testing stage as this week began. None gave promise of being especially prolific. Don Rayburn 1 Gabel, ½ mile southwest of the Weber Oil Co. 1 Gabel discovery, indicated approach to an edge. At week end the report was that an estimated 1,000 ft. of water and about 400 ft. of oil was in the hole. In neighboring Pinora Township, which adjoins the Lincoln Township section of heavy production, Gulf Refining Co. also was troubled with water in 1 Gingrich, Section 36. Indications were that the hole is another edge well. Officials said the well will be put on pump and that production of from 100 to 200 bbl. a day is expected. In Section 30 of Lincoln Township, C. W. Teater 1 Baderschneider had been swabbing around 100 bbl. a day after acid treatment and was to be placed on pump after hole was plugged back about 10 ft. to avoid water. Pure Oil Co. planned to acidize 3 Jewett in Section 31 in hope of boosting production naturally of a few hundred barrels a day.

Wildcat failures ruined two hopes for new oil production in Isabella County last week. In Coe Township, Leonard Drilling Co. 1 Whitney hit water in Dundee. The hole had flowed both oil and water at intervals while drilling. The other dry hole is Burruss & Quinlan 1 Winesburg in Deerfield Township. Originally completed for gas in Stray formation, the hole was deepened. Only water was encountered in drilling to 3,714 ft.

MICHIGAN COMPLETIONS

Arenac County

Adams Township: Don Rayburn 1 White, SW SW SW 24-19n-3e, pumping 20 bbl., acid, T.D. 2,162 ft.

Deep River Township: Fisher-La Fleur-Schiller, Tr., 1 Brooks, C E½ NE SE 9-19n-4e, wildcat, dry, T.D. 3,037 ft.

Bay County

Gibson Township: Ervin Major 1 McDonald, SW SE SW 2-18n-3e, wildcat, dry, T.D. 2,995 ft.

Berrien County

Lake Township: K. G. Nilsen 1 Milham, SE SE SW 31-6s-19w, wildcat, temporarily abandoned, T.D. 755 ft.

Clare County

Winterfield Township: Pure Oil Co. B-1 Egts, C E½ NW SW 29-20n-6w, 32 bbl., acid, T.D. 3,164 ft.

Sun Oil Co. A-7 State-Winterfield, C S½ SE NE 35-20n-6w, dry, T.D. 3,800 ft.

Isabella County

Coe Township: Leonard Drilling Co. and Rowmor Corp. 1 Whitney, C W½ NW SE 20-13n-3w, wildcat, dry, T.D. 3,627 ft.

Deerfield Township: Burruss & Quinlan 1 Winesburg, SE SW SW 20-14n-5w, wildcat, dry, T.D. 3,714 ft., 2,200,000 cu. ft. gas pay at 1,292 ft.

Kent County

Gaines Township: Rex Oil & Gas Corp. 1 Wood et al, C E½ SE NW 33-5n-11w, wildcat, dry, T.D. 2,010 ft.

Wyoming Township: Lamar Oil Co. B-2 Grand Rapids Gravel Co., NW SE SW 3-6n-12w, pumped 50 bbl. in 72 hr., acid, T.D. 1,806 ft.

Livingston County

Hartland Township: Voorhees Drilling Co. 1 Migratory Bird Farm, NE NW NE 24-3n-6e, wildcat, dry, T.D. 1,815 ft.

Missaukee County

Riverside Township: Taggart Bros. Co. 24 Dunham-Sparta Bank, C NE 20-21n-7w, 672,000 cu. ft. gas, T.D. 1,488 ft.

Taggart Bros. Co. 26 Geeseman, C SW 20-21n-7w, 3,230,000 cu. ft. gas, T.D. 1,444 ft.

Taggart Bros. Co. 25 Good-Schepars-Bodery, C NE 17-21n-7w, dry, T.D. 1,493 ft.

Monroe County

Summerfield Township: Regis Cook 1 Plotner, NW NW NE 31-6s-6e, wildcat, temporarily abandoned, T.D. 2,180 ft.

Ottawa County

Georgetown Township: G. C. Berlin 1 Vandenwal, SE NW NW 18-6n-13w, location abandoned.

Van Buren County

Bloomingdale Township: H. L. Wheeler 1 Pullen, SE NW NW 1-1s-14w, pumping 50 bbl. with water, T.D. 1,287 ft.

Columbia Township: Clapsaddle, Harris & Fulton 10 Pepper, NW SW NW 23-1s-15w, pumping 10 bbl. and water, acid, T.D. 1,177 ft.

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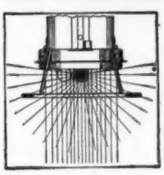

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North Outpost to Cut Bank Proves Good Producer

By T. R. INGRAM

DENVER, Colo., Sept. 15.—An outpost well in the northern part of the Cut Bank field, in Montana, 22 miles north of the most southerly producer, swabbed and flowed 473 bbl. in 24 hours. This was A. B. Cobb-Texas Co. 1 Mueller, NW NW SW 2-35n-6w. It is ¼ mile north of a well drilled in 1935 by the Texas Co. on the Mueller farm which swabbed 57 bbl. first 15 hours, and ½ mile west and a little south of Montana Power 1 Rigney which had only 125 ft. of oil in the Cut Bank sand. After making 473 bbl. in 24 hours, it later swabbed 8 bbl. an hour.

Limits of production in the Whitlash gas field on the southwest were defined in Western Natural Gas 3 Brown, SW NE SW 20-37n-4e, which was dry at 2,560 ft. It is a mile to the southwest of the nearest gas well.

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The Argo Oil Corp. 17-B Elliott, SW NE NE 6-35n-65w, near the top of the Lance Creek structure, showed some oil with water in the lower Leo sands at 5,462 ft., total depth, and after acidizing several times as it was plugged back and completed for 400,000 cu. ft. of gas on a 20/64-in. bean. It will be used for an intake well for repressuring.

WYOMING COMPLETIONS

Horse Creek, Laramie County: Indian Hills Oil 1 Kirkbride, C NE NW 14-18s-66w, T.D. 1,200 ft. in Pierre shale, abandoned.

La Barge field, Sublette County: North La Barge Oil 9 Government, CSL NE NE 28-27n-113w, T.D. 1,286 ft., P.B. and tested sand at 1,135 ft. without results, plugged and abandoned.

Lance Creek field, Niobrara County: Continental 9-A Schuricht, NW NW SW 5-35n-65w, T.D. 5,260 ft., 7-in. 5,140 ft., top first Leo sand 5,066 ft., 320 bbl. a day initial.

Argo 17-B Elliott, SW NE NE 6-35n-65w, T.D. 5,462 ft., 7-in. 5,377 ft., water with oil in lower Leo sands, completed in first Leo through perforations at 4,998-5,014 ft. for 400,000 cu. ft. gas on 20/64-in. bean.

South Elk Basin field: MacKinnie Oil & Drilling 1 Northern Pacific, CNL NW NW 5-57n-99w, T.D. 1,944 ft., made 2 bbl. a day.

Torchlight field, Big Horn County: McDonald & Curtis 1 Orchard, SE NW 24-51n-93w, hole full of water at 1,235 ft., plugged and abandoned.

MONTANA COMPLETIONS

Basin Creek, wildcat, Yellowstone County: Yale Oil 1 Government, C NE SE 7-2s-26e, abandoned at 1,300 ft.

Bowes field, Blaine County: Independent Natural Gas 1 Cole, NW NW NW 11-31n-19e, T.D. 820 ft., water in Eagle sand, plugged and abandoned.

Cut Bank field, Glacier County: W. F. Saunders, tr., 1 Tribal-199, NE SE SE 24-32n-6w, T.D. 3,032 ft., Cut Bank sand 2,974-3,029 ft., main pay 3,019-29 ft., no swabbing test, 1,400 ft. oil in hole, est. 200 bbl.

A. B. Cobb-Texas 1 Mueller, NW NW SW 2-35n-6w, T.D. 3,009 ft., 7-in. 2,958 ft., Sunburst 2,925-68 ft., Cut Bank 2,968-3,007 ft., swabbed and flowed 473 bbl. first 24 hr., now swabbing 8 bbl. an hour.

Par Oil 1 Tribal-204, NE NE SE 13-32n-6w, T.D. 2,830 ft., 7-in. 2,720 ft., 200 ft. of oil from Sunburst at 2,695-2,735 ft., Cut Bank 2,749-2,800 ft., main pay 2,785-2,800 ft., 1,000 ft. oil, no swabbing test, est. 150 bbl.

Kevin-Sunburst field, Toole County: Hannah-Porter 2 Donovan, C SE NE 35-33n-2w, T.D. 1,470 ft., Sunburst 2,347-70 ft., 3,000,000 cu. ft. gas.

Montana-Dakota Utilities 325 Elvig-State, C SW NE 36-34n-2w, T.D. 1,250 ft. top Sunburst at 1,105 ft., dry and abandoned.

Casper T. Olen 3 Government, NW SW NE 14-35n-2w, T.D. 1,517 ft., contact 1,512-17 ft., pumping 10 bbl. a day natural.

Whitlash field, Liberty County: Western Natural Gas 3 Brown, SW NE SW 20-37n-4e, T.D. 2,560 ft., dry and abandoned.

Illinois Fields

(Continued from Page 246)

Bell Bros. 8 Skiles, SW NE SW 16-4s-14w, pumped 44 bbl., 40-qt. shot 2,838-49 ft., Aux Vases 2,835 ft., T.D. 2,849 ft.

Rising Sun: Magnolia 6 Sisson-Higgins, NE SW SE 24-6s-10e, pumped 95 bbl., 17-qt. shot 2,254-66 ft., Tar Springs sand 2,252 ft., T.D. 2,269 ft.

Cherry & Kidd et al 6 Karch, NW NW NE 24-6s-10e, pumped 88 bbl., 20-qt. shot 2,005-16 ft., Palestine sand 2,007-17 ft., T.D. 2,022 ft.

Cherry & Kidd et al 1-A Karch, SW NW NE 24-6s-10e, pumped 50 bbl., 20-qt. shot 2,003-19 ft., Palestine 1,998 ft., T.D. 2,026 ft.

Skelly 2 H. Karch, NE SE SE 13-6s-10e, pumped 201 bbl. oil and 46 bbl. water, Palestine 2,016-33 ft., T.D. 2,033 ft.

Cherry & Kidd 1-B Karch, SE SW SE 13-6s-10e, pumped 64 bbl., 40-qt. shot in Aux Vases, Aux Vases sand 2,844-55 ft., T.D. 2,865 ft.

Roland: Carter 3 W. W. Fuller, NW SE NW 11-7s-8e, flowed 250 bbl., 30-qt. shot 2,899-2,911 ft., Aux Vases 2,880-98 ft. 2,898-2,908 ft., T.D. 2,916 ft.

Cities Service 1 Mount, E½ SW SE NE 11-7s-8e, pumped 184 bbl., 20-qt. shot 2,158-67 ft., 30-qt. shot 2,726-38 ft., Benoist 2,717 ft., Waltersburg 2,155-67 ft., T.D. 2,748 ft., P.B. 2,185 ft.

New Haven: Hiawatha 4 Vail, NW NW SE 19-7s-11e pumped 12 bbl. oil and 36 bbl. water, 40-qt. shot 2,719-36 ft., Aux Vases 2,719 ft., T.D. 2,851 ft.

Phillipstown: Phillips 3 Garr, SW NW SW 36-4s-10e, pumped 25 bbl. oil and 12 bbl. water, 60-qt. shot 2,958-74 ft., Rosiclare 2,955 ft., T.D. 2,974 ft.

Texas Panhandle

(Continued from Page 244)

Dunigan et al 2-A Luginbyl, 4-J T.W.&N.G. Sur., pumped 98 bbl. from 3,050-3,150 ft., T.D. 3,174 ft.

Gulf 8 Cockrell-C, 2-M-21 T.C.R.R. Sur., pumped 69 bbl. from 2,980-3,120 ft., T.D. 3,125 ft.

Phillips N-76 Cockrell, 3-M-21 T.C.R.R. Sur., pumped 185 bbl. from 2,947-3,075 ft., T.D. 3,084 ft.

Phillips 5 Supreme, 25-M-23 T.C.R.R. Sur., pumped 172 bbl. from 3,180-3,262 ft., T.D. 3,262 ft.

Reiger 1 Merchant, 32-47 H.&T.C. Sur., 41 bbl. oil and 43 bbl. water from 2,670-81 ft., T.D. 2,681 ft.

Shell 29 Harvey-B, 14-M-21 T.C.R.R. Sur., pumped 366 bbl. from 3,035-70 ft., T.D. 3,077 ft.

Skelly 10 Watkins-A, 13-M-21 T.C.R.R., pumped 171 bbl. from 2,810-70 ft., T.D. 2,890 ft.

Stanolind 12 Lewis, 7-23 B.S.&F. Sur., pumped 195 bbl. from 2,880-2,975 ft., T.D. 2,985 ft.

Stanolind 5 Moore 21-M-21 T.C.R.R. Sur., pumped 459 bbl. from 2,970-3,079 ft., T.D. 3,079 ft.

Wheeler County: Smith Bros. 11-A Johnson, 34-24 H.&G.N. Sur., pumped 39 bbl., 2,425-2,500 ft., T.D. 2,505 ft.

Smith Bros. 13 Johnson, 34-24 H.&GN. Sur., pumped 32 bbl. from 2,495-2,560 ft., T.D. 2,566 ft.

Personal Paragraphs

C. N. VAERIUS, district geologist and landman for Barnsdall Oil Co., has moved his headquarters from Wichita Falls to Dallas, Tex. Mr. Vaerius covers North Texas, East Texas, and South Arkansas.

DR. M. G. EDWARDS, who started his association with Shell Oil Co. in 1924 and who has worked in the geological department for the past 14 years, has been appointed chief geologist in California succeeding F. S. HUDSON, who resigned a short time ago.

R. S. FULLER, engineer in charge of operations of Pacific Gas & Electric Co., has been elected president of the Pacific Coast Gas Association; and F. M. BANKS, vice president of Southern California Gas Co., and D. G. MARTIN of Pacific Gas & Electric Co. were elected vice president and treasurer, respectively. O. R. DOERR, Pacific Gas & Electric Co.; F. A. HOUGH, Southern Counties Gas Co.; D. H. PERKINS, San Diego Gas & Electric Co., and C. O. MENIG were elected members of the board of directors at the annual fall meeting in Del Monte, September 11.

GEORGE W. EBERT, Oil City, Pa., traffic manager for the Quaker State Oil Refining Co., attended the Allegheny regional traffic advisory board meeting in Pittsburgh, Pa., last week.

VAUGHN C. MALEY, division geologist at Midland, Tex., for Humble Oil & Refining Co., is chairman of the arrangements committee for the forthcoming fall field trip of the West Texas Geological Society. The party will visit the scene of the proposed Big Bend national park.

O. L. ELY has been made traffic manager of Anchor Petroleum Co., Tulsa. He comes to Tulsa from Amarillo, Tex., where he has been connected with Phillips Petroleum Co. for the past 2 years. Prior to that he was traffic manager for Waggoner Refining Co., Electra, Tex., and for the W. T. Waggoner Estate, Vernon, Tex.

C. J. WILHELM, petroleum engineer of the U. S. Bureau of Mines at Bartlesville, Okla., will be in Oil City, Pa., September 22, to discuss production problems of the Pennsylvania region which the bureau might give some aid in solving. The meeting will be in charge of R. B. BOSSLER, engineer for Brundred Oil Corp., who is chairman of the advisory committee of the Pennsylvania Grade Crude Oil Association.

CECIL HAGEN, consulting geologist of Houston, Tex., has returned from a business trip to Cuba.

FRED W. SHIELD has been appointed chairman of the San Antonio attendance and golf committee for the Texas Mid-Continent Oil and Gas Association's convention, October 9-11.

CAPT. H. L. DAHLLOF, of the tanker L. P. St. Clair, which delivered the first cargo of gasoline to Russia recently, has been taken acutely ill with enteritis aboard his vessel.

D. W. HOVEY, vice president and general manager of the Republic Oil & Refining Co., Houston, Tex., left last week for a business and pleasure trip to Washington and New York.

W. M. V. ASH, formerly administrative assistant to E. F. DAVIS, vice president of Shell Oil Co., Inc., at Los Angeles, Calif., has taken up new duties in the New York offices of the company.

S. G. DOLMAN, deputy state oil and gas supervisor, Division of Oil and Gas, California Department of Natural Resources, was in Los Angeles this week on business but has returned to his office in Santa Barbara, Calif.

GUY E. MILLER, Ph.D., formerly division manager for Shell Oil Co., Inc., at the Long Beach, Calif., office, has returned from a short trip in the Mid-Continent area to assume new duties as chief geologist in the Los Angeles offices, succeeding FRANK HUDSON, who resigned several months ago. SAM BOWLBY is now acting division manager at Long Beach.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

South of Okmulgee, Okla., the Kimberly-Cosden interests have purchased the Waite Phillips oil property for $150,000, according to a recent report.

At Cement, Okla., last week, the Keeche Oil & Gas Co. drilled in a 10,000,000-cu. ft. gasser at 800 ft. The gas caught fire and destroyed the rig. Cement is having an oil boom, many fortune seekers being attracted to the locality.

After 3 months' work, the Naval Fuel Board, headed by Rear Admiral John R. Edwards, U.S.N., retired, is beginning to receive replies to a list of questions sent to all the large oil concerns, fuel-oil chemists, and all oil-plant engineers in the country.

20 YEARS AGO

First oil to be marketed from Greer County, Oklahoma, has been shipped by W. A. Son and associates to the refinery at Frederick. It was the production of the Star Oil Syndicate's well in 25-7-21w.

Appointment of H. C. Morris, of Washington, D. C., as chief of the newly created Fuel Division of the Bureau of Foreign and Domestic Commerce, was announced by Secretary Hoover.

In all of its primitive oil-hunting atmosphere, New Mexico is one of the leading states where wildcat work is progressing in spite of the many setbacks in recent years.

10 YEARS AGO

Clifford C. Gaylord, assistant secretary and treasurer of the Rio Grande Oil Co., died unexpectedly last week.

J. A. Fletcher, of Barnsdall Oil Co., Longview, Tex., has been elected chairman of the Lathrop district committee, a unit of the East Texas fire-protection committee recently organized by the American Petroleum Institute's Division of Production in the new East Texas oil-field area.

W. P. TAYLOR, of Houston, Tex., has organized the Taylor Drilling Co. and has opened offices in the Mellie Esperson Building.

C. S. WIMPRESS, of Union Oil Co. of California, refinery department, has been appointed assistant to W. L. STEWART, JR., vice president in charge of refining.

EARL STEVENSON, formerly located in the Monroe, La., district for the United Gas Co., has been transferred to the company's offices at Houston, Tex.

JOHN D. GILL, economist for the Atlantic Refining Co., addressed the Philadelphia Kiwanis Club last week. He urged that government let the oil industry solve the oil shortage.

CHARLES B. BOONE, Gulf Oil Corp., has been named chairman of the Gulf Coast chapter, American Society of Safety Engineers, Houston, Tex.

PARK J. JONES, Texas Co., Fort Worth, Tex., will lead the discussions at a series of meetings planned by the Petroleum Engineers Club of Fort Worth. The meetings will feature discussions on the subject, "Introduction to Developing and Operating Oil and Gas Properties."

ROSS N. HAYES, telegraph operator at Humble Pipe Line Co.'s mainline station at Hawley, Tex., has patented a new vernier device which provides a positive indication when the overlapping part of two lines comes into registry. The inventor believes the instrument will be valuable in measuring linear distances or angles and, consequently, has offered it to military officials as a potentially important instrument in directing artillery or naval fire.

EQUIPMENT PROGRESS...

Husky Welding Clamp Speeds Up Pipe-Line Welding

The Husky welding clamp speeds up pipe-line welding jobs. It is made for the welding of all thin-wall high-tensile line pipe, and will exert sufficient pressure to remove all the "egg" from the pipe. This clamp was used by the contractors on the 26-in. natural-gas pipe line from Amarillo, Tex., to the Chicago area.

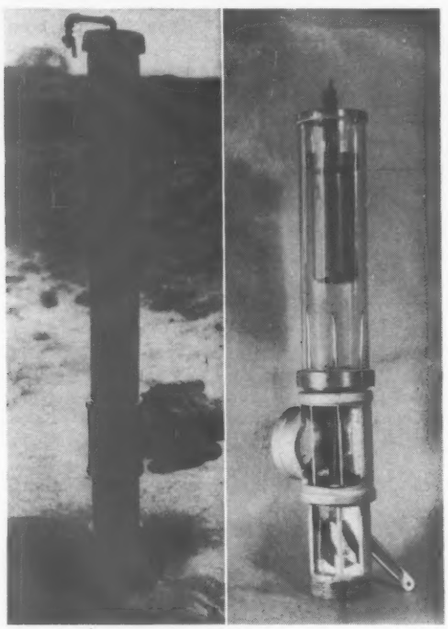
The manufacturer states that it is practical for all weights of line pipe. It is manufactured by the Husky Manufacturing Co., 211 West Archer Street, Tulsa.

Hayes Offers Automatic Shut-Off Valve for Pipe-Line Service

A successful shut-off valve has been developed, which is designed to keep air out of gathering lines by shutting off field tanks when they are emptied. It is used in connection with an air bleeder which not only lets air pass out from the ground line, but also relieves line pressure built up by gas or heat. The valve float rises into the riser pipe when tripped from its seat by the gager, and remains off the seat until released by air coming through when the oil in the tank has gone down to the top of the tank outlet.

The valve is inserted in the head line so one installation will care for the entire battery. It fits into standard fittings, so does not clutter up the lines with cumbersome material, and is not hard to remove. As there are no wearing parts, 100 per cent salvage is possible. The plastic float is used, which will not crush nor oil log.

The valve was developed by J. T. Cronkhite, president of Hayes Equipment Manufacturing Co., Wichita, Kans.



Left: View of an installation at a tank battery. Right: View showing working parts of the shut-off valve with float in position after tripping

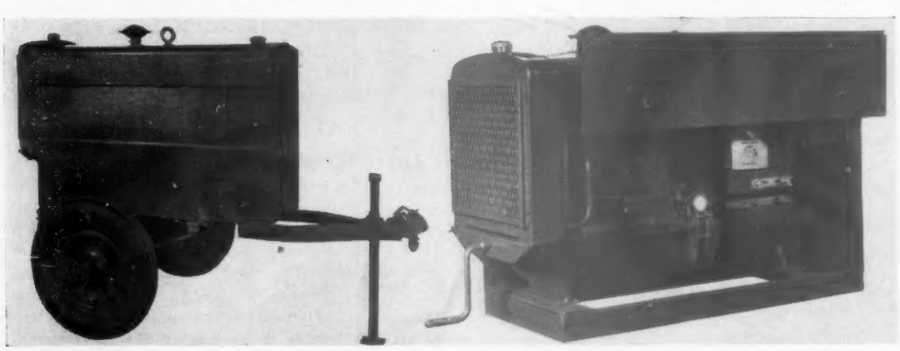
WESTINGHOUSE OFFERS A NEW PIPE-LINE WELDING TOOL

To meet present demands, many manufacturers of welding equipment have designed and built during the past several years gas-engine-driven welders for the specific use of pipe-line contractors. The aim in every case was to manufacture a unit which had an adequate current range for the size of rod required and at the same time, to build a unit which was light in weight and would give long life in field service.

One of the most recent developments along this line is the Westinghouse light-weight gasoline-engine-driven welder. The stationary model of this unit weighs but 910 lb. without gas and oil. It has a current range of from 40 to 250 amp., and is rated 200 amp., 1-hour. The standard design, shown in Fig. 1, mounted on a two-wheeled, pneumatic tires running gear, is complete with canopy, idler, governor and air cleaner, all of which are features designed by pipe-line contractors.

The unit is powered by a Hercules Type IXB-3, four-cylinder 1,750 r.p.m. gasoline engine. A standard magneto-ignition system is used on the engine. Gas is fed to the carburetor by gravity. A centrifugal water pump circulates water through the cooling system.

The ease of portability, simplicity of design, and lightness in weight make this unit particularly adaptable to the pipe-line contractors' work. The heavy steel body construction adds rigidity, so necessary when hauling the unit over rough terrain.



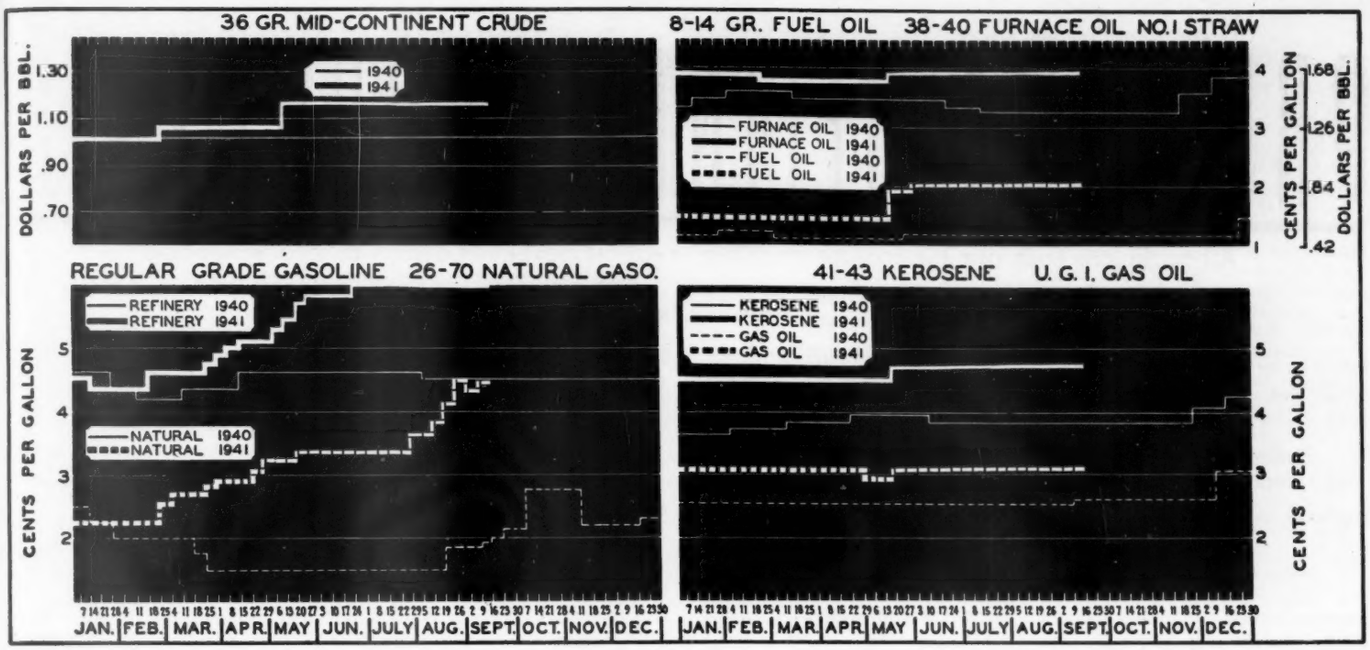
Removable Pressure Lock Packer Developed by Otis

A pressure lock locking device and preset pressure seal packing elements are two new features used for the first time in a packer by Otis Pressure Control, Inc., Dallas, Tex. Revolutionary in design, they provide a secure and positive lock and yet are easily removed under most adverse conditions. These features are the result of extensive laboratory and field tests which have proved the many advantages of this tool.

The pressure lock locking device consists of only one set of slips. However, the construction is such that a pressure differential in either direction across the packer is utilized to further lock it in place. Consequently, the greater the pressure the more securely the slips "grip" the casing. The slip assembly has eight individual slips with a combined slip area much greater than that of the conventional packer therefore, the lock is both positive and flexible. One of the most important features of this lock is that neither the weight of the tubing string nor a column of mud in the casing annulus is necessary to hold the packer against upward thrust; consequently, the packer cannot blow out of the hole nor can the tubing drop should the surface connections become damaged. Furthermore, the tubing is always in a freely suspended position. By far, the most valuable feature of the lock is the ease with which it can be released. After the tubing has been pulled up a distance of about 3 ft., the bypass through the packer opens. Further upward movement of the tubing imparts a jar to the slip mandrel, causing it to move out of the slips and permitting them to retract.

The preset pressure seal packing elements are made of oilproof neoprene molded and vulcanized to a steel connection ring and reinforced with a composition fabric cup. The outside diameter of these elements in all cases is approximately $\frac{1}{16}$ in. larger than the inside diameter of the casing in which they are run; however, they are designed so that the neoprene can flow inwardly to eliminate possible wearing and tearing. No mechanically applied force or pressure differential is necessary to cause the packing to expand and shut off. Because the natural shape of the neoprene affects the seal and it is not necessary to compress the element to cause it to "cold flow," no unnecessary stress and strain are left in the present elements. This minimizes the vulcanizing of the elements to the casing walls. The flexibility of this packer is best shown by tests which proved they shut off perfectly against pressures ranging from 1 lb. to 7,500 lb. per sq. in.

The principal usages of the pressure lock packer are (1) to hold a column of mud in the casing annulus, (2) for two-zone production, (3) to set 300 to 1,000 ft. below surface to protect well from flowing wild, due to damage to surface connections, and (4) for two-zone pumping production.



Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)

Rising Costs of Transportation and Record Demand Buoy Product Prices

RISING transportation costs and unprecedented demand combined this week to point the trend of petroleum markets toward higher brackets in all sections of the country.

Demand and prices in the Mid-Continent section were particularly strong for natural gasoline. The current price of 4.5 cents per gallon for 26-lb. material quoted by Oklahoma and Kansas manufacturers became effective September 9 but even this figure, which is equal to the market for regular refinery motor fuel in the Group 3 territory a year ago, has not discouraged buyers. Manufacturers are behind on their deliveries and new inquiries are going begging. Deliveries are being prorated to established customers on a basis of previous purchases.

Demand for refinery gasoline continues at peak levels at unchanged prices. Northern buyers are combing the Mid-Continent market for burning oils with scarcely any inquiries meeting with full satisfaction. Refiners are holding their distillate fuels for higher prices which most observers expect to develop with the first cold weather in the middle western states. Demand for gasoline has been so firm that refiners have continued maximum operation of cracking equipment. Distillate fuels that are normally available on the spot market are being cracked for maximum gasoline production.

High side of the Mid-Continent wax market moved up this week in support of advanced quotations on the Atlantic seaboard.

Lubricating oils are practically unavailable on the spot market. Refiners are limiting shipments to contract customers and are exploring all possible operating adjustments that will increase yields.

Sales of Several Cargoes Stimulate Gulf Markets

HOUSTON, Tex., Sept. 15.—Gulf Coast refinery markets took on new activity as the week opened.

Included in the buying were two cargoes of 83-octane gasoline for which 6.625 cents per gallon was paid. This is 0.125 cent premium over the top quoted price of 80-octane material.

Two cargoes of kerosene also were bought. For one 3.75 cents was paid and for the other 4 cents.

Two cargoes of No. 2 fuel oil were bought on the basis of 3.5 cents per gallon. Sellers generally have been reluctant to move material at that figure owing to the value of the product as cracking stock.

Bunker C fuel continued in demand with very little material on hand. Purchases during the week included at least two cargoes at 84 and 85 cents. An additional cargo of higher gravity fuel was bought at 96 cents for export movement.

Prices Advanced on Several Products in Eastern Market

NEW YORK, Sept. 16.—All products in the East Coast refined market continued strong last week. Wax and residual fuel oil were higher.

Bunker C fuel oil was reported sold on the spot market in New York Harbor at $1.50 per barrel, an increase of 5 cents. Another cargo of Bunker C fuel oil was sold in the New England area at $1.65 per barrel, up 30 cents.

White crude scale-wax sales made last week were reported on the basis of 6 to 6.25 cents.

There were reports of slightly higher quotations on low-octane gasoline in barge lots, but the tank-car price of 8 to 8.5 cents on 72-74-octane material in the New York Harbor district was unchanged. Retail prices were also unchanged. Lower rail rates from inland sources of supply will serve as a brake on any tendency of gasoline prices to advance in this area. Resort to higher-cost rail transportation which virtually every major company on the East Coast has either adopted or plans to adopt will necessitate some increase in prices as this factor becomes more important.

Some companies are reported to be limiting deliveries of both light and heavy fuel oil to 90 per cent of those made in the same period a year ago.

Service-station operators have not indicated any intention of eliminating the 7 p.m.-to-7 a.m. closing, but, on the contrary, an increasing number are reported to be closing on Sundays as well.

A.P.I. Weekly Refinery Statistics

Week Ended September 13, 1941

	Capacity reporting (per cent)	Total gasoline stocks (bbl.)	Residual fuel-oil stocks (bbl.)	Gas oil and distillate stocks (bbl.)	Daily crude runs (bbl.)
East Coast	100.0	19,238,000	10,241,000	16,418,000	599,000
Appalachian	83.8	3,113,000	569,000	602,000	143,000
Ind., Ill., and Ky.	84.4	14,414,000	4,453,000	5,578,000	658,000
Okla., Kans., and Mo.	80.7	6,748,000	2,016,000	2,039,000	311,000
Inland Texas	63.2	2,233,000	1,355,000	457,000	149,000
Texas Gulf	91.0	11,447,000	8,297,000	6,142,000	1,014,000
Louisiana Gulf	94.2	2,977,000	2,022,000	1,570,000	154,000
N. Louisiana and Ark.	49.9	397,000	426,000	361,000	57,000
Rocky Mountains	50.1	1,019,000	403,000	125,000	66,000
California	90.9	13,569,000	64,471,000	12,689,000	508,000
Total reported	86.4	75,155,000	94,253,000	45,981,000	3,659,000
Est. unreported	.....	5,400,000	1,500,000	1,290,000	351,000
*Est. total	.....	†80,555,000	95,753,000	47,271,000	4,010,000
*Est. total previous wk.	.....	81,571,000	95,125,000	46,127,000	3,995,000
*Sept. 14, 1940	.....	82,983,000	107,335,000	46,556,000	3,580,000

*Bureau of Mines. †Includes 7,452,000 bbl. aviation gasoline.

PRICES OF REFINED PRODUCTS...

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of September 16, 1941
(Most prices in cents per gallon)

The quotations are exclusice of the federal excise taxes of 1.5 cents a gallon on gasoline and 4 cents a gallon on lubricating oils. Octane ratings in Middle West, Mid-Continent, and Southwest are based on A.S.T.M. method of testing.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
72-74 octane (regular)	.06	.0625
63-66 octane	.05625	.05875
60 octane and below	.0525	.055
60-62 400 grades:		
72-74 octane (regular)	.06	.0625
63-66 octane	.05625	.05875
60 octane and below	.0525	.055

NORTH TEXAS—

U. S. Motor grades:		
72-74 octane (regular)	.05875	.06125
63-66 octane	.0550	.06
60 octane and below	.05125	.05375
60-62 400	.05	.06

NORTH LOUISIANA (Ark. and N. La. delivery)—

U. S. Motor grades:		
72-74 octane (regular)	.05875	.06125
63-66 octane	.0550	.05875
60 octane and below	.05	.06

ARKANSAS (Ark. and N. La. del.)—

U. S. Motor grades:		
72-74 octane (regular)	.05875	.06125
60 octane and below	.05	.05375

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
72-74 octane (regular)	.06	.0625
63-66 octane	.05625	.05875
60 octane and below	.0525	.055
60-62 400 grades:		
72-74 octane (regular)	.06	.0625
63-66 octane	.05625	.05875
60 octane and below	.0525	.055

PENNSYLVANIA (inland refineries)—

74-76 octane (regular)	.0750	.0775
80 octane (1939 Research)		.0800

CALIFORNIA (domestic movement)—

58-60 400, 65 oct. and higher	.065	.0725
54-58 U. S. Motor	.0575	.0625

EAST COAST (domestic)—

U. S. Motor (minimum 72 octane):		
New York (Bayonne)*	.08	.085
Philadelphia	.08	.0825
Boston	.085	.09
Baltimore	.08	.0825
Charleston, S. C.	.0725	.0775

*All grades of gasoline ½ to ¼ cent less for barge shipments. New York Harbor prices are for New York and New England delivery. Prices for New Jersey delivery ¼ cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
80 (research)	.0625	.0650
72-74 octane (leaded)	.06	.0625
70-72 octane (unleaded)	.06	.0625
68-70 octane (unleaded)	.0575	.0600

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70	.045
Grade 18-55	.05375

NORTH TEXAS—

Grade 26-70	.04125
Grade 18-55	.04875

CALIFORNIA—

75-85 375-390	.045	.05

NORTH LOUISIANA (Ark. and N. La. delivery)—

Grade 26-70	.04125

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 i.b.p. 110-flash, 540-550 e.p.	.0375	.03875
41-43 gr., 300-320 i.b.p. 110-125 flash, 500-520 e.p.	.03875	.04
46-48 gr., 210-230 i.b.p. 480 max., e.p.	.04125	.0425

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

42-44	.0450	.0475
41-43	.04375	.04625

NORTH TEXAS—

41-43	.0425	.04625

NORTH LOUISIANA (Ark. and N. La. delivery)—

41-43	.04375	.04625

ARKANSAS (Ark. and N. La. del.)—

41-43	.04375	.04625

PENNSYLVANIA (inland refineries)—

46	.06	.065
45	.06	.06375

CHICAGO (Based on Group 3)—

42-44	.0450	.0475
41-43	.04375	.04625

CALIFORNIA (Pac. Coast market)—

38-40 high-burning test	.045	.055

NEW YORK (Bayonne, N. J.)—

41-43	.055

GULF COAST (domestic)*—

41-43	.0375	.04

*Barge price ⅛ cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

Range oil	.04	.0425
No. 1 white (38-42)	.03875	.04125
No. 2 straw (32-36)	.0350	.0375
No. 3 zero to 10 (28-32)	.03375	.03625

NORTH TEXAS—

No. 1 white (38-42)	.03825	.04125

NORTH LOUISIANA (Ark. and N. La. delivery)—

No. 2 (32-36)	.0325	.035

ARKANSAS (Ark. and N. La. del.)—

No. 2, 32-36	.0325	.035

CHICAGO (Based on Group 3)—

Range oil	.04	.0425
No. 1 white (38-42)	.03875	.04125
No. 2 straw (32-36)	.035	.03625
No. 3 zero to 15 (28-32)	.03375	.035

NEW YORK (Bayonne, N. J.)—

*No. 1		.055
*No. 2	.051	.0525
*No. 3	.051	.0525

*Barge deliveries ⅛ to ¼ cent under above tank-car price.

Gas Oil and Fuel Oil

(Gas oil per gal., fuel oil per bbl.)

OKLAHOMA (Group 3)—

No. 5, low pour point (18-22)	.85	.90
No. 6, 15 and above (10-16)	.85	.90

NORTH TEXAS—

No. 5, low pour point (18-22)	.80	.85
No. 6, 15 and above (10-16)	.80	.85

NORTH LOUISIANA (Ark. and N. La. delivery)—

10-14 fuel oil, industrial	.80	.85

CHICAGO (Based on Group 3)—

No. 5, low pour point (18-22)	.85	.90
No. 5, 15 and above (18-22)	.85	.90
No. 6, low pour point (10-16)	.85	.90
No. 6, 15 and above (10-16)	.85	.90

PENNSYLVANIA (inland refineries)—

36-40	.05875	.0625

CALIFORNIA—

Los Angeles:		
30-40 gas oil, per bbl.	1.10	1.25
24 plus diesel, per bbl.	1.10	1.25
24 plus diesel (bunkers)	1.20	1.35
12-16 (bunkers at tidewater)	.75	.85
10-16 (cargo lots)	.75	.85
12-17 (tank cars)	.65	.75
10-17 (high sulfur)	.55	.65
San Joaquin Valley:		
10-18 (tank cars)	.70	.85
24 plus diesel, per bbl.	1.10	1.25
San Francisco:		
24 plus diesel, per bbl.	1.35	1.40
24 plus diesel (bunkers)	1.40	1.50
10-16 (bunkers)	.80	.85

GULF COAST—

No. 2 fuel		.035
43-47 diesel		.035
48-52 diesel	.03625	.0375
53-57 diesel	.0375	.03875
58-and-above diesel		.03875
Diesel bunkers		1.45
Bunker C (bulk cargoes)	.85	.90
Bunker C (bunkers)		.85

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.050
28-30 diesel (lighterage 6¼c per bbl.)		2.15
28-30 diesel (tank cars)		.05
Bunker C (to ocean-going ships in N. Y. Harbor)	1.35	1.45
Industrial fuel (tank cars)		.044

Lighterage charge 5c bbl. additional.

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25	.26
150-160 D, 0-10	.22
150-160 D, 10-25	.215
100-110 D, 0-10	.215
100-110 D, 10-25	.21
Steam refined:	
600 dark green (untreated)	.135

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):	
10 pour point	.295
15 pour point	.285
25 pour point	.25 .28
Steeam refined:	
600	.14 .16
650	.145 .165
600 flash	.15 .17
630 flash	.16 .175

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
150-3	.135
180-3	.14
200-3	.14
250-3	.155
280-3	.165
280-4	.16
300-3	.175
350-3½	.18
400-3½	.19
500-3½	.195
600-3½	.20
100-2½ paraffin oil 10-25	.0775
10-25 pour point:	
200-3	.135
250-3	.15
280-3	.16
280-4	.15

CALIFORNIA (moving to dom. mkt.)—

Pale oils:		
200-2½-3	.07	.0775
300-2½-3	.07	.0775
400-3-4	.0725	.08
450-3-4	.0725	.08
550-3-4	.0875	.1075
600-3-4	.0875	.11
Red oils:		
200-4-5	.07	.0775
300-5-6	.0725	.08
350-5-6	.09	.11
400-5-6	.09	.11
450-5-6	.09	.1125
500-5-6	.0925	.1125
600-5-6½	.0925	.1125
700-6½ plus	.0925	.1125
750-6½ plus	.0925	.1125
900-6½ plus	.0925	.1125

GULF COAST—

Pale oils:		
100-3	.0625	.0650
200-3	.0850	.0875
300-3	.09	.0925
500-3½	.0975	.10
750-3½	.10	.1025
1,200-3½	.1025	.10375
2,000-4	.1050	.1075
3,000-4	.1225	.1250

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:		
Zero pour point		.385
10 pour point		.375
15 pour point		.365
25 pour point	.31	.35
200 vis., at 70° F., 3 color:		
Zero pour point		.40
10 pour point		.395
15 pour point		.385
25 pour point	.33	.37

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (A.m.p.) w.c. scale	.055	.0575

PENNSYLVANIA (inland refineries)—

122-124 (A.m.p.) w.c. scale	.055	.06
124-126 (A.m.p.) w.c. scale	.055	.06

NEW YORK—

Wax in bags fully refined:		
125-127 (A.m.p.) wax	.0560	.0640
128-130 (A.m.p.) wax	.0560	.0660
130-132 (A.m.p.) wax		.0585
133-135 (A.m.p.) wax		.0615
135-137 (A.m.p.) wax		.0640
Crude scale:		
124-126 (A.m.p.) w.s.	.055	.06
124-126 (A.m.p.) y.s.	.055	.06
Petrolatum in barrels, carload lots:		
Dark green		.02875
Amber	.02875	.03125
Extra amber	.03125	.03375
Lily white	.04875	.05375
Snow white	.05625	.05750
Cream	.04125	.05250

Export Prices

GASOLINE

GULF COAST—

60-62 400	.05125	.065
61-63 390	.05625	.0625
64-66 375	.05625	.0625

LOS ANGELES—

U. S. Motor grades:		
Above 60 octane	.06	.0625
65-69 octane	.0575	.06
60-65 octane	.0525	.055

KEROSENE

GULF COAST—

41-43 water white	.035	.0375

LOS ANGELES—

41-43 water white	.05	.0525

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.a.s. in bbl.)—

Cylinder stocks:	
600 S.R. unfiltered	.23
630 S.R. unfiltered	.235
600 flash, S.R.	.24
650 flash, S.R.	.25
Bright stock:	
Light, 25 pour point	.34 .35

NEUTRAL OIL

200-3 color	.43	.50
150-3 color	.41	.46

PARAFFIN WAX

NEW YORK (prices per bbl.)—

123-125 A.m.p.	.0560	.0625
125-127 A.m.p.	.0560	.0625
128-130 A.m.p.	.0585	.0650
133-135 A.m.p.	.0615	.0700
135-137 A.m.p.	.0640	.0700
Crude scale:		
124-126 w.s.	.0575	.06
124-126 y.s.	.0575	.06

Crude Price Changes

Posted price for Cotton Valley (Louisiana) distillate was raised 10 cents per barrel September 1 by Premier Oil & Refining Co. and by Standard Oil Co. of Louisiana, making the new quotation for this production $1.40 per barrel, irrespective of gravity.

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Smackover, Arkansas, heavy	.83
Illinois basin	1.37
Pecos County, Texas	.95
Lance Creek, Wyoming	1.12
Bradford, Pennsylvania	2.75

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity	Signal Hill Calif.	Okla. homa, Kansas	Gulf Coast, Texas	West Texas, Lea County, N. M.
18-18.9	$0.80	...	...	...
19-19.9	.84	...	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	...	1.07	1.30	.94
32-32.9	...	1.09	1.32	.96
33-33.9	...	1.11	1.34	.98
34-34.9	...	1.13	1.36	1.00
35-35.9	...	1.15	1.38	1.02
36-36.9	...	1.17	1.40	1.04
37-37.9	...	1.19	1.42	1.06
38-38.9	...	1.21	1.44	1.08
39-39.9	...	1.23	1.46	1.10
40 and above	...	1.25	1.48	1.12

RETAIL OIL MARKETS...

Tank-wagon and filling-station prices on gasoline and kerosene furnished by larger marketing firms

Prices as of September 16, 1941

Taxes

The gasoline quotations given in the following tables include the 1½-cent federal tax, as well as state, county, and city taxes. The gasoline is the regular or standard grade. In most areas lower grades and a premium grade also are available.

Standard Oil Co. (Indiana)

	Gasoline Tank wag.	Gasoline Dlr. tax	Gasoline Inc. tax	Kero. tank wag.
Chicago, Ill.	16.1	14.1	4.5	10.3
Decatur	15.4	13.4	4.5	9.5
Joliet	16.4	14.1	4.5	10.3
Peoria	16.2	14.7	4.5	10.1
Quincy	13.4	12.4	4.5	10.0
Davenport, Ia.	16.2	14.7	4.5	10.1
Des Moines	15.9	12.9	4.5	9.8
Mason City	16.2	14.7	4.5	10.1
Duluth, Minn.	17.7	16.2	5.5	10.6
Mankato	17.4	15.9	5.5	10.3
Minneapolis	17.4	15.9	5.5	10.3
La Crosse, Wis.	17.4	15.9	5.5	10.3
Green Bay	17.7	16.2	5.5	10.6
Milwaukee	17.6	16.1	5.5	10.5
Detroit, Mich.	15.9	14.4	4.5	9.6
Grand Rapids	15.9	14.4	4.5	9.6
Saginaw	15.9	14.4	4.5	9.6
Evansville, Ind.	16.9	15.4	5.5	9.6
Indianapolis	17.1	15.2	5.5	9.8
South Bend	17.5	16.0	5.5	10.2
Fargo, N. D.	18.4	16.9	5.5	11.3
Huron, S. D.	17.8	16.3	5.5	10.7
Kansas City, Mo.*	14.9	13.4	4.5	9.4
St. Louis*	14.8	13.3	4.5	9.8
St. Joseph	15.7	14.2	4.5	9.6
Wichita, Kans.	14.8	12.7	4.5	8.0

*State tax 2 cents, 1-cent city tax, and 1½-cent federal tax.

Stanolex Fuel Oil in Chicago

Effective July 17, 1941, f.o.b. Chicago, tank-wagon prices: Standard heater oil, 1-99 gal., 8.75 cents; 100-149 gal., 7.75 cents; 150 gal. and over, 7.25 cents. Stanolex fuel oil No. 1, 1-99 gal., 8.5 cents; 100-149 gal., 7.5 cents; 150-399 gal., 7.25 cents; 400 gal. and over, 6.75 cents. Stanolex furnace oil, 1-99 gal., 8.5 cents; 100-149 gal., 7.5 cents; 150-399 gal., 7.25 cents; 400 gal. and over 6.75 cents. Stanolex fuel oil A, 1-99 gal., 8.0 cents; 100-399 gal., 7.0 cents; 400-749 gal., 6.0 cents, 750 gal. and over, 5.25 cents. Stanolex fuel oil B, 1-99 gal., 8.0 cents; 100-399 gal., 7.0 cents; 400-749 gal., 6.0 cents; 750 gal. and over 5.25 cents. Stanolex Bunker C fuel oil, 1-399 gal., 6.5 cents; 400-999 gal., 5.5 cents; 1,000 gal and over, 4.5 cents.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline Cons'r tank wag.	Gasoline Dlvided dlr.	Gasoline Inc. tax	Kero. tank wag.
Ohio points	16.0	15.0	5.5	*9.0

*Includes state tax of 1 cent.

Southern District

STANDARD OIL CO. (KENTUCKY)

	Gasoline Cons'r tank wag.	Gasoline Net dlr.	Gasoline Inc. tax	Kero. tank wag.
Atlanta, Ga.	18.00	18.00	7.5	10.0
Augusta	18.00	18.00	7.5	9.5
Macon	18.00	18.00	7.5	10.0
Savannah	17.00	17.00	7.5	9.0
Birmingham	18.50	18.50	8.5	8.0
Mobile	18.50	18.50	9.5	8.5
Montgomery	19.50	19.50	9.5	10.0
Jackson, Miss.	17.50	17.50	7.5	9.0
Vicksburg	17.00	17.00	7.5	8.5
Jacksonville, Fla.	18.00	18.00	8.5	8.0
Miami	18.00	18.00	8.5	8.0
Pensacola	18.50	18.50	9.5	8.0
Tampa	18.00	18.00	8.5	8.0
Lexington, Ky.	17.00	17.00	6.5	9.0
Covington	16.0	16.0	6.5	9.0
Louisville	16.50	16.50	6.5	8.5
Paducah	16.50	16.50	6.5	8.5

Pennsylvania and Delaware

ATLANTIC REFINING CO.

	Gasoline Cons'r tank car	Gasoline Dlr. tank wag.	Gasoline Inc. tax	Kero. tank wag.
Philadelphia, Pa.	14.0	15.0	5.5	10.15
Pittsburgh	14.5	15.5	5.5	10.5
Allentown	14.5	15.5	5.5	10.5
Erie	14.5	15.5	5.5	10.0
Scranton	14.5	15.5	5.5	10.5
Altoona	14.5	15.5	5.5	10.5
Dover, Del.	...	15.5	5.5	10.5
Wilmington	...	15.0	5.5	10.0

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline Cons'r tank car	Gasoline Dlr. tank wag.	Gasoline Inc. tax	Kero. tank wag.
Atlantic City	13.0	14.0	4.5	7.9
Newark	13.0	14.0	4.5	7.9
Annapolis	13.85	15.35	5.5	9.7
Baltimore	13.25	14.75	5.5	8.7
Cumberland	14.65	16.15	5.5	10.2
Washington, D. C.	11.50	13.00	3.5	9.2
Danville, Va.	15.45	17.45	6.5	10.45
Norfolk	14.25	16.25	6.5	10.2
Petersburg	14.55	16.55	6.5	11.2
Richmond	14.55	16.55	6.5	11.2
Roanoke	15.75	17.75	6.5	10.7
Charles'n, W. Va.	15.55	18.05	6.5	11.5
Parkersburg	14.85	17.35	6.5	11.2
Wheeling	15.25	17.35	6.5	11.8
Charlotte, N. C.	17.40	18.90	7.5	9.5
Hickory	17.95	19.45	7.5	10.5
Mount Airy	17.80	19.30	7.0	9.7
Raleigh	17.15	18.65	7.0	10.5
Salisbury	17.45	18.95	7.5	10.9
Charleston, S. C.	15.25	17.75	7.5	(*)
Columbia	16.10	18.60	7.5	(*)
Spartanburg	16.80	19.30	7.5	(*)

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline Tank wag.	Gasoline Inc. tax	Kero. tank wag.
Denver, Colo	14.5	5.5	11.0
Grand Junction	18.0	5.5	12.5
Pueblo	14.5	5.5	9.5
Casper, Wyo.	17.0	5.5	12.0
Cheyenne	16.0	5.5	11.5
Billings, Mont.	18.0	6.5	12.5
Butte	17.0	6.5	13.5
Great Falls	17.0	6.5	12.5
Helena	17.0	6.5	13.0
Salt Lake, Utah	18.5	6.5	14.5
Boise, Idaho	†20.1	6.5	16.5
Twin Falls	†21.1	6.5	17.0
Albuquerque, N. M.	*17.5	7.0	10.0
Roswell	*15.5	7.0	8.5
Santa Fe	‡18.0	7.5	10.0

*Includes city tax of 0.5 cent. †Includes toll-bridge tax of 1 mill. ‡Includes city tax of 1 cent.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline Comm. tank wag.	Gasoline Dlr.* tax	Gasoline Inc. tax	Kero. tank wag.
Albany	14.2	14.7	5.5	7.7
Met. New York	14.4	14.9	5.5	8.0
Buffalo	14.5	15.0	5.5	8.3
Rochester	15.1	15.6	5.5	8.8
Syracuse	14.8	15.3	5.5	8.7
Portland, Me.	14.6	15.1	5.5	8.1
Manchester, N. H.	15.6	16.1	5.5	9.0
Burlington, Vt.	15.2	15.7	5.5	8.3
Boston, Mass	13.2	13.7	4.5	8.0
Worcester	13.8	14.3	4.5	8.1
Hartford, Conn.	13.9	14.4	4.5	7.6
New Haven	13.3	13.8	4.5	6.9
Providence, R. I.	13.3	13.8	4.5	7.8

Texas

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Dallas, Tex.	14.0	17.0	5.5	7.0
Fort Worth	14.0	17.0	5.5	7.0
Houston	14.0	18.0	5.5	8.0
San Antonio	14.0	18.0	5.5	7.0

Oklahoma and Arkansas

CONTINENTAL OIL CO.

	Gasoline Tank wag.	Gasoline Incl. tax	Kero. tank wag.
Texarkana, Ark.	14.0	5.5	6.0
Fort Smith	15.5	7.0	6.5
Little Rock	17.25	8.0	8.0
Muskogee, Okla.	15.0	7.0	8.0
Oklahoma City	15.0	7.0	8.0
Tulsa	15.0	7.0	8.0

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline Cons'r tank car	Gasoline Dlr. tank wag.	Gasoline Incl. tax	Kero. tank wag.
New Orleans, La.	15.25	17.25	8.5	‡10.0
Baton Rouge	15.25	17.25	8.5	‡10.5
Alexandria	15.25	17.25	8.5	‡10.5
Lafayette	15.50	18.00	8.5	‡10.0
Lake Charles	15.50	18.00	8.5	‡10.0
Shreveport	15.0	17.0	8.5	9.0
Knoxville, Tenn.	18.00	20.50	8.5	12.5
Memphis	16.25	18.75	8.5	10.5
Chattanooga	17.50	19.5	8.5	11.0
Nashville	17.75	19.5	8.5	10.0
Bristol	18.25	18.75	8.5	12.0

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline Tank truck	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
San Francisco	17.5	18.5	4.5	11.5
Los Angeles	17.9	18.0	4.5	10.0
Fresno, Calif.	18.5	19.5	4.5	12.5
Phoenix, Ariz.	21.5	22.5	6.5	12.5
Reno, Nev.	20.5	21.5	5.5	13.5
Portland, Ore.	20.0	21.0	6.5	13.5
Seattle, Wash.	20.0	21.0	6.5	13.5
Spokane	22.0	23.0	6.5	16.5
Tacoma	20.0	21.0	6.5	13.5

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline Tank wag.	Gasoline Dlr.	Gasoline Incl. tax	Kero. tank wag.
Omaha	17.9	15.4	6.5	9.8
McCook	18.5	15.9	6.5	9.5
Norfolk	18.4	16.9	6.5	10.3
North Platte	18.8	16.4	6.5	10.7
Scottsbluff	18.9	16.0	6.5	10.0

Naphtha

STANDARD OIL CO. (INDIANA)

	Tank wagon*
Oleum spirits	16.2
V.M.&P. naphtha	16.5
Cleaners' naphtha	15.5
Stanisol	15.5

*Prices include 3-cent Illinois tax but not 1-cent federal tax nor 2 per cent retail occupational tax.

Tank-Wagon Changes

Texas Co. and other large distributors advanced tank-wagon prices at Texas points 1 cent per gallon, effective September 11. Retail motor-fuel prices were advanced 0.5 cent per gallon at Dallas and Fort Worth while a raise of 1 cent was posted at San Antonio and Houston, Tex.

Standard Oil Co. (Indiana) advanced consumer and dealer tank-wagon prices 1.4 cents per gallon at St. Louis, Mo., effective September 4. The dealer tank-wagon price was reduced 0.6 cent per gallon at Wichita, Kans., effective September 5.

Standard Oil Co. of California advanced tank-wagon and service-station prices 0.5 cent per gallon at noon September 11 in Spokane, Wash.

Cary Field Discovery Well Still in Testing Stage

(Continued from Page 245)

MISSISSIPPI COMPLETIONS

Wildcat, Yalabousha County: J. E. Green 1 Geldman, 179 ft. from N and 1,146 ft. from W lines 23-25n-6e, old T.D. 1,392 ft., new T.D. 2,400 ft., top Selma 1,259 ft., dry.

Tinsley, Yazoo County: Magnolia 5 Mitche Payne, NW SE 35-10n-3w, Woodruff 4,841-72 ft., T.D. 4,876 ft., 7-in. 4,839 ft., 2½-in. tubing 4,872 ft., pumped 150 bbl. in 14 hr.

ALABAMA COMPLETIONS

Wildcat, Fayette County: J. W. Mills 1 W. G. Musgrove, C NW 10-15s-12w, 10-in. at 60 ft., show gas 517-38 ft., coal seam 589-92 ft., show gas at 595 ft., T.D. in Pottsville 1,495 ft., flowing fresh water and bubbling gas, dry and abandoned.

CLASSIFIED ADVERTISING

Royalties

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., Tulsa Loan Bldg., Tulsa, Okla.

MONTHLY asphalt royalty income and a rock asphalt deposit for sale. Write owner, Lewis Smyth, Uvalde, Texas.

REGISTERED DEALERS
WE MAINTAIN A MARKET FOR
IN ALL TYPES OF OIL ROYALTIES

FIRST DEPENDABLE OIL CORP.
522 Fifth Ave., New York, N. Y.

Help Wanted

PERMANENT job open for combination electrician and instrument man. Large independent refinery. Must understand Foxboro, Leeds & Northrup, Brown, Fisher, electric and air operated controls. Also have 500 KW power plant. Five room modern house on company property. Box A-635, The Oil and Gas Journal, Tulsa, Okla.

FELLOWSHIP open for graduate student having a degree in Chemical or Petroleum Engineering. Special training in Colloidal Chemistry helpful but not absolutely necessary. Opportunity to apply research work toward the doctorate. Address reply to Box A-641, The Oil and Gas Journal, Tulsa, Okla.

WANTED

Refinery Safety Engineer.

Position includes responsibility for pressure still inspections, general safety work, and fire protection equipment. Some operating or engineering experience preferred. Reply Box A-653, The Oil and Gas Journal, Tulsa, Okla.

YOUNG Pipe Line accountant, familiar with I.C.C. accounts. State experience and salary. Box A-661, The Oil and Gas Journal, Tulsa, Okla.

Help Wanted

WANTED

SUPERVISOR, Lubricating Oil Department, Canadian Refinery. Young man with technical education and practical experience in modern Lubricating Oil Refinery. State in first letter age, marital status, education, experience, Nationality, Religion, present occupation and salary, and references. Address Box A-654, The Oil and Gas Journal, Tulsa, Okla.

Situations Wanted

REFINERY manager, superintendent, and engineer. Experienced in construction, operation and maintenance. Aviation and high octane gasolines. Age 41. Box A-632, The Oil and Gas Journal, Tulsa, Okla.

NATURAL Gas Engineer — Technically trained—12 years' experience in solving transmission and distribution problems; estimating reserves; calculating peak days, load factors const. costs, anticipated earnings, etc. Authored articles for trade journals, gas associations, and taught courses in gas engineering. Desire to make change. Age 33. Address Box A-650, The Oil and Gas Journal, Tulsa, Okla.

PETROLEUM ENGINEER: Young man, college graduate, P.P.E. degree, draft classification 3-A. Three years' experience including service engineer, production engineer, and general field work. Desires position with drilling and production company as geologist, engineer, or scout. Box A-631, The Oil and Gas Journal, Tulsa, Okla.

Geophysical Service

LOCATE mineral domes by Geophysical methods. Be sure of production on over burdened structures. Peter W. Dericks, Columbus, Neb.

ILLINOIS Oil Possibilities, Twelve years' experimenting with Doodle-bug work, has led us into a scientific method, and we expect to produce oil above 1,000 feet in Edgar, Coles and Cumberland Counties, Illinois. We need capital, active or silent partner. Can demonstrate on the ground to your satisfaction. S. J. Burkitt, Mowequa, Illinois.

RODESSA REFINERY

Offered!

As it Stands—Or in Complete Units Including Butane and Naphtha Plants

RARE OPPORTUNITY

For Buyers of Equipment

This is the outstanding buying opportunity of the year. The entire refinery of the Rodessa Oil & Refinery Corporation at Cedar Grove, Louisiana (near Shreveport), is offered for quick sale. First come, first served!

The entire refining plant (all modern fire-proof buildings and structures) includes 75 acres of land, with utilities system for water, electrical power and sewers and switching facilities.

A Modern Plant, Ready for Operation

Do not confuse this practical refinery with the average abandoned or obsolete plants occasionally on the market. In 1938, approximately $1,500,000.00 was spent for installation of brand new units. Plant is ready for operation with all high pressure furnaces, towers, hot oil charge pumps, the most modern automatic control instruments and all good serviceable equipment.

This refinery was closed down August 1940, for reasons that have nothing to do with the serviceability of the plant and its equipment.

Capacities of Plant

Crude oil, 10,000 barrels daily—cracking, 6,000 barrels. The refinery is equipped to produce gasoline, kerosene distillate, gas oil, fuel oil.

Some of the More Important Units Are:

Complete cracking plant — complete butane plant — Naphtha unit — Topping — Stabilization — Absorption — Ethyl blending units — complete experimental unit — approximately 650,000 barrels of steel storage tanks — butane and casinghead storage tanks — complete machine shops — complete bulk plant — warehouse stock inventories — complete fire-fighting equipment — complete power plant.

Detailed inventory is now being completed. Our representative is on the ground daily and all units can be inspected any time.

Why wait weeks and months for the delivery of new equipment? Look this refinery over and fill your needs immediately! Resident engineer at site.

BROWN-STRAUSS CORPORATION

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Shreveport, La.
Phone 7-7334
Leonard Strauss
Resident Engineer

Main office
KANSAS CITY, MO.
Long Dist. Phone 169
Harry B. Strauss
Manager

FOR SALE

Located one-half mile south of Shidler, Oklahoma, complete booster plant consisting of:

6—190 HP, Type 3, New Watts-Miller twin gas engines and two-stage, high and low, compressors.

2—70 HP, New Watts-Miller, Overhead Belt-driven engines.

Large quantity of extra parts for 190 HP New Watts-Miller Engines and Compressors; bearings, pistons, rings, valves, etc.

1—Steel building, 222' long x 32' wide.

1—Steel auxiliary building, 30' x 32' wide. Both buildings are braced with 6" I-beams.

A number of steel buildings with wood frames.

10—Scrubber tanks, all sizes, high pressure and low pressure.

Large stock of fittings, from 2" including 16", flange and screw.

Large stock of used line pipe and casing.

3—Two-pass brass tube cooling coils and 3—Three-pass brass tube coolings coils, Griscom and Russel make.

Approximately one and one-half miles of mesh wire fencing.

A quantity of electrical equipment, including generator,

22—Foamite fire extinguishers

1—Extra large Foamite fire extinguisher tank, mounted on wheels, with 50' hose attached.

If interested, please write
KAHAN PIPE & SUPPLY CO.
P. O. Box 682, Tulsa, Oklahoma.
Or call 4-6537, Tulsa, Oklahoma.

FOR SALE—1 PA 100 International Motor almost new. 1 12-in. 6-ply 60 ft. endless belt. Box 278, Salem, Ill.

FOR SALE: Big pipe for pipe line, light weight, 5 miles, subject to prior sale Box 574, Tulsa, Okla.

FOR SALE at Oklahoma City: A quantity of repaired and unrepaired duplex piston steam pumps, 6 x 4 x 6 and 10 x 3½ or 4½ x 10. Cities Service Oil Co., Bartlesville, Okla.

IN STOCK
NEW PORTABLE PIPE LINE PUMPING UNIT

Consisting of two 4-stage Byron Jackson centrifugal pumps with manifold for series and parallel operation, and Falk step-up gear, all mounted on heavy electrically welded structural steel frame. Capacities: 5,000 Bbl. against 700 psi pressure or 12,000 Bbl. against 300 psi. Designed for Le Roi 6-cyl. gas engine or Caterpillar D-13000 diesel engine. Unit will accommodate any 100-HP engine of 900 RPM.

Write for price and further information:
JOHN M. McGREGOR
P. O. Box 1141
Tulsa, Okla.

DERRICKS—66's and 74's—Heavy duty tubular derricks complete with crown blocks. All in strictly A-1 condition. Al Brown Supply Co., Box 841, Kilgore, Tex.

FOR SALE: 4 Gasoline Vapor Drums 46" x 49' 6", thickness of Drums 1¾", complete with Hair Pins. These Drums in very good condition. American Pipe and Supply Company, Casper, Wyoming.

COMPRESSOR for sale—Imperial type XOG Ingersoll-Rand — 440 Cubic Feet. Write or wire Box 1084, Overton, Tex.

FOR SALE
COMPRESSORS

From 100# to 2,000# discharge pressures in capacities from 100 cu. ft. to 3000 cu. ft. per minute either belted or direct connected gas, electric or Diesel types.

ELECTRIC MOTORS
25 Cycle and 60 Cycle
From 75 to 250 HP

ENGINES
Gas & Diesel
from 50 to 500 HP

L. F. SMITH COMPANY
217 W. Archer
Tulsa, Oklahoma

We guarantee the condition of all equipment rebuilt by us.

700—3" 600-2000# Forged Steel Wing Unions—List $7.25, priced to move $4.25 each. P.O. Box 1625, Fort Worth, Tex.

FOR SALE: 5 x 12 Oil Well Power Slush Pump with 100 H.P. Waukesha Motor. Melton Supply Co., Seminole, Okla.

FOR SALE: WILSON Double Drum Well Servicing Unit with spudder attachment. Melton Supply Co., Seminole, Okla.

FOR SALE: 6—40 Gallon Foam Outdoor Type Mounted Fire Extinguishers. Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: 125 H.P. 200 W.P. Broderick Boiler, Code Condition, $975. Melton Supply Co., Seminole, Okla.

FOR SALE at Oklahoma City: Large quantity 65, 70, 75 and 85 hp. oil field boilers, repaired and unrepaired. Cities Service Oil Co., Bartlesville, Okla.

LARGE GASOLINE PLANT

being dismantled. Bessemer equipment, gas engines & other machinery, tanks, towers, regulators, meters, recording gauges, valves, tools, pipe fittings, etc. GILBERT PIPE & SUPPLY, Electra, Tex.

FOR SALE at Seminole—One Allis-Chalmers Model "U-E" Tractor Pulling Unit. Cities Service Oil Co., Bartlesville, Okla.

FOR SALE: 6 x 16 Wilson-Snyder Power Slush Pump. Melton Supply Co., Seminole, Okla.

FOR SALE: Two Fairbanks-Morse Power Pumps, size 5½ x 12, Serial #99548 and #99549. Pumps in good shape and ready to go. The American Pipe & Supply Co., Casper, Wyoming.

FOR SALE Cheap, At Oklahoma City Garage: 9 new 40 x 8, 12-ply Acme tires in original wrappers. Patridge, Cities Service Oil Company, Bartlesville, Okla.

FOR SALE—Good Lydecker #24 drilling machine with tools. Inquire C. A. Alkman, 1209½ East Douglas, Wichita, Kansas, or Henry Bennett, Augusta, Kansas.

FOR SALE: 28 Star drilling machine complete. Oversize shaft; electric attachment; perfect condition; $500.00. R. Landman, Box 208, El Dorado, Kansas.

AUCTION SALE

REFINERY—LEADING PLANT

Pursuant to order of sale made by the Referee in Bankruptcy in this cause, I, the undersigned Trustee of the estate of Lake Refining Company, Bankrupt, will offer for sale at Public Auction at 11:00 A.M. on Tuesday, September 30, 1941, the crude oil refinery belonging to this estate, consisting of skimming plant and leading plant, railroad spur, loading racks, still, bubble tower, flash tower, cooling tower, pumps, motors, 16 storage tanks (500 barrels to 5,000 barrels), and large lot of miscellaneous equipment. The property will be offered in bulk and also in detail lots. The sale will be held at the refinery premises, 2 miles southwest of Salem, Illinois. A deposit of 25% in cash or cashier's check will be required with all bids.

INVENTORY FURNISHED UPON REQUEST.

PAUL L. HALE, Trustee

P. O. Box 391 123 East Broadway . Centralia, Ill.